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<http://www.digitalemccom>

**CERTIFICATE OF COMPLIANCE**  
**FCC Part 22 & 24 Certification**

Dates of Tests: January 25 ~ February 4, 2006

Test Report S/N:DR50110602K

Test Site : DIGITAL EMC CO., LTD.

Model No.

**SBWVK4500**

APPLICANT

**VK Corporation**

<b>Classification:</b>	<b>Licensed Portable Transmitter Held to Ear (PCE)</b>
<b>FCC Rule Part(s):</b>	<b>§22(H), §24(E), §2</b>
<b>EUT Type:</b>	<b>GSM850/900/1800/1900 Quad-Band GSM Terminal with Bluetooth Equipment</b>
<b>Model name:</b>	<b>VK4500</b>
<b>Serial number:</b>	<b>Identical prototype</b>
<b>TX Frequency Range:</b>	<b>824.2 ~ 848.8 MHz (GSM850) / 1850.2 ~ 1909.8 MHz (PCS1900)</b>
<b>RX Frequency Range:</b>	<b>869.2 ~ 893.8 MHz (GSM850) / 1930.2 ~ 1989.8 MHz (PCS1900)</b>
<b>Max. RF Output Power:</b>	<b>0.740 W ERP GSM850 (28.69dBm) 0.957 W EIRP PCS1900 (29.81dBm)</b>
<b>Max. SAR Measurement:</b>	<b>0.402 mW/g GSM850 Head SAR // 0.511 mW/g GSM850 Body SAR 0.332 mW/g PCS1900 Head SAR // 0.257 mW/g PCS1900 Body SAR</b>
<b>Date of Issue:</b>	<b>April 10, 2006</b>

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## MEASUREMENT REPORT

### 1. Scope

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

### §2.1033 General Information

**Applicant: VK Corporation**

**Address: VK B/D, 548-6, Anyang 8dong, Manan-gu, Anyang City, Kyonggi do, 430-716, Korea**

**Attention: Eric Won (Principal Manager)**

- FCC ID: SBWVK4500
- Quantity: The mass product
- Tx Freq. Range: 824.2 ~ 848.8 MHz (GSM850) / 1850.2 ~ 1909.8 MHz (PCS1900)
- Rx Freq. Range: 869.2 ~ 893.8 MHz (GSM850) / 1930.2 ~ 1989.8 MHz (PCS1900)
- Max. Power Rating: 0.740 W ERP GSM850 (28.69dBm)  
0.957 W ERIP PCS1900 (29.81dBm)
- FCC Classification(s): Licensed Portable Transmitter Held to Ear (PCE)
- Equipment (EUT) Type: GSM850/900/1800/1900 Quad-Band GSM Terminal  
with Bluetooth Equipment
- Modulation(s): GMSK
- Frequency Tolerance:  $\pm 0.00025$  % (2.5ppm)
- FCC Rule Part(s): §22(H), §24(E), §2
- Dates of Tests: January 25 ~ February 4, 2006
- Place of Tests: DIGITAL EMC
- Test Report S/N: DR50110602K

## 2. Introduction

This report contains the result of tests performed by:

DIGITAL EMC CO., LTD.

Address : 683-3, Yubang-Dong, Yongin-Si, Kyunggi-Do, Korea. 449-080

<http://www.digitalemc.com> E-mail : demc@unitel.co.kr

Tel: +82-31-321-2664 Fax: +82-31-321-1664

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competent of calibration and testing laboratory".

This laboratory is accredited by NVLAP for NVLAP Lab. Code : 200559-0.

**Test operator: engineer**

April 10, 2006

Won-Jung LEE

Data

Name

Signature

**Report Reviewed By: manager**

April 10, 2006

Harvey Sung

Data

Name

Signature

Ordering party:

Company name : VK Corporation  
 Address : 6F, Vk B/D, 548-6, Anyang 8dong, Manan-gu  
 Zipcode : 430-716  
 City/town : Anyang City, Kyonggi do  
 Country : KOREA  
 Date of order : December 16, 2006

### 3. Test Report

#### 3.1 Summary of tests

FCC Part Section(s)	Parameter	Status (note 1)
22.913(a) / 24.232(b) 2.1046	Power Output	C
22.917 / 24.238 2.1049(h)(i)	Occupied Bandwidth	C
22.917(b) / 24.238(b)	Emission Bandwidth	C
22.917 / 24.238 2.1051	Emission Limits Transmitter	C
2.1053 (a)	Field Strength of Spurious Radiation	C
2.1055	Frequency Stability	C
Note 1: C= Complies    NC=Not Complies    NT=Not Tested    NA=Not Applicable		

The sample was tested according to the following specification:

FCC Parts §24(E), §22(H), §2; ANSI C-63.4-2003

## 3.2 Requirements

### 3.2.1 Output Power

FCC ID	: <b>SBWVK4500</b>
Specification	: 47 CFR 2.1046 (a)
Tested Frequency	: 824.2MHz, 836.6MHz and 848.8MHz for GSM850 1850.2MHz, 1880.0MHz and 1909.8MHz for PCS1900

#### Measurement Procedure:

- During the process of testing, the EUT was controlled via Radio Communication tester to ensure max. power transmission and proper modulation.
- Power output was measured at the RF output terminals when the transmitter is adjusted in accordance with communication tester (or the tune-up procedure).

#### Measurement Data:

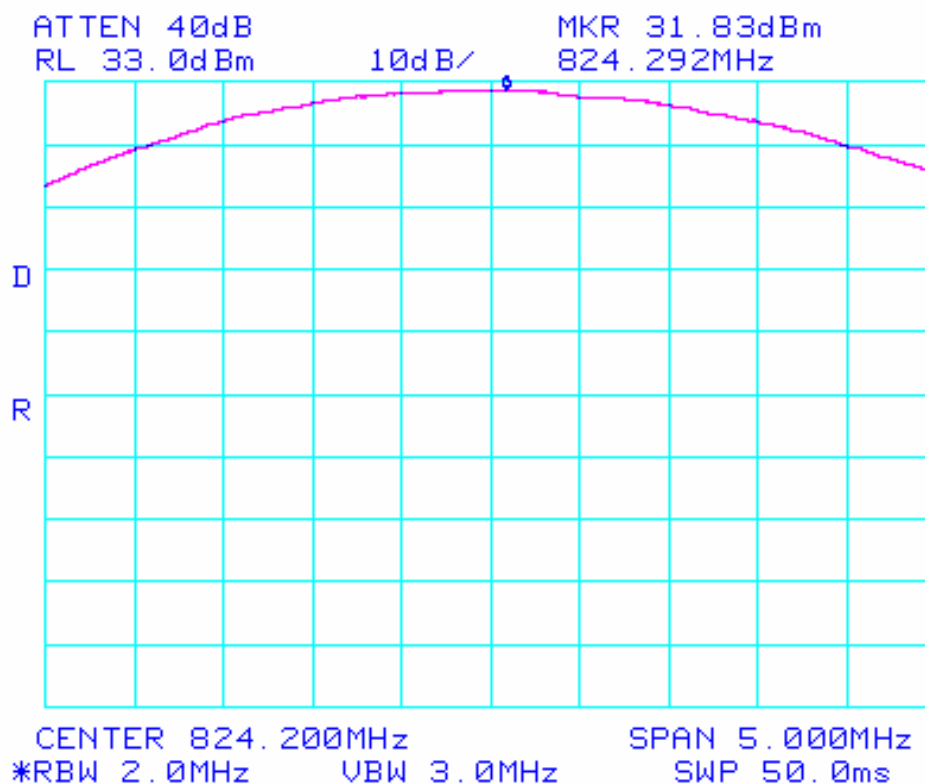
##### GSM850

Channel	Frequency (MHz)	TEST CONDITIONS Power Step: 5
		(dBm)
128	824.2	<b>31.83</b>
190	836.6	<b>32.00</b>
251	848.8	<b>32.17</b>

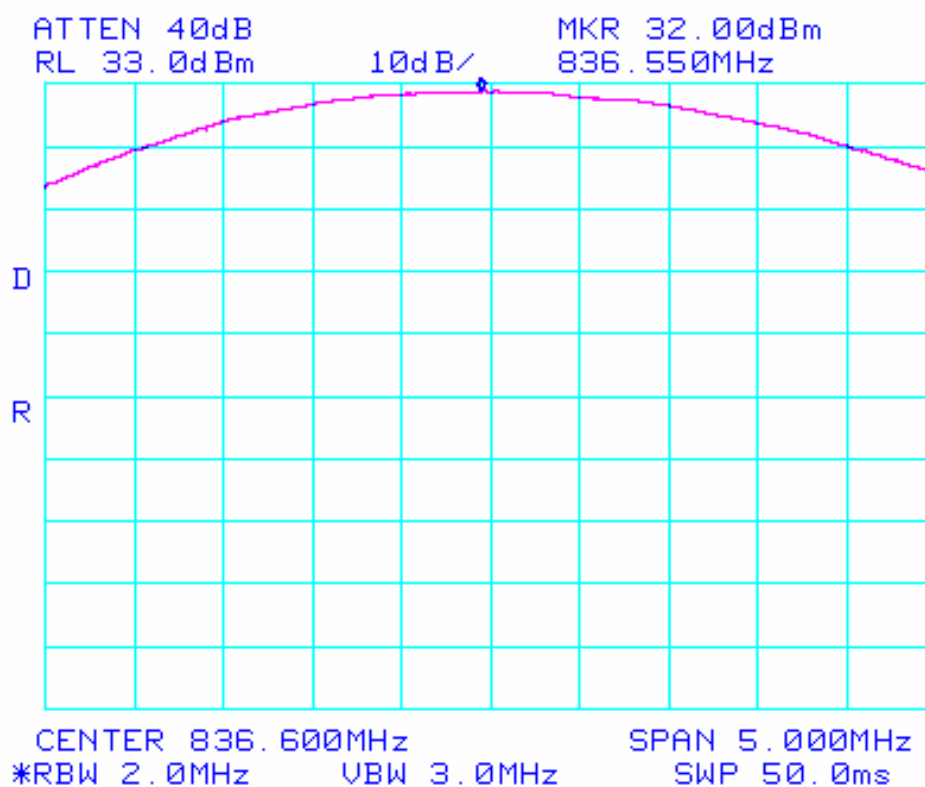
##### PCS1900

Channel	Frequency (MHz)	TEST CONDITIONS Power Step: 0
		(dBm)
512	1850.2	<b>30.50</b>
661	1880.0	<b>30.17</b>
810	1909.8	<b>29.83</b>

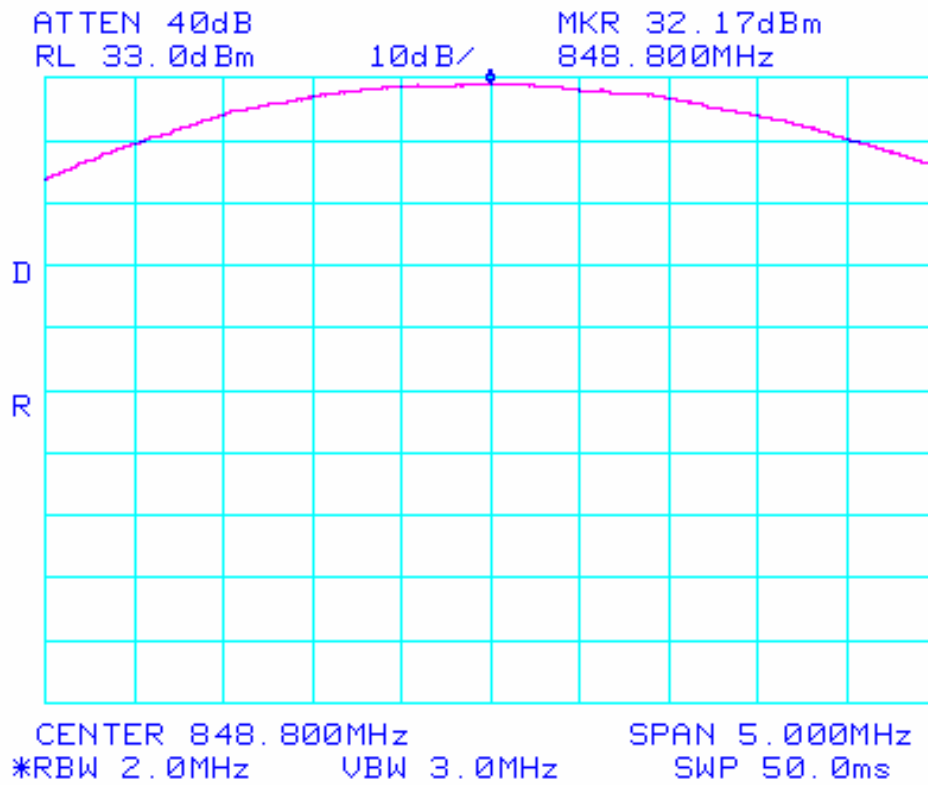
POWER OUT. GSM850 Ch.128



POWER OUT. GSM850 Ch.190

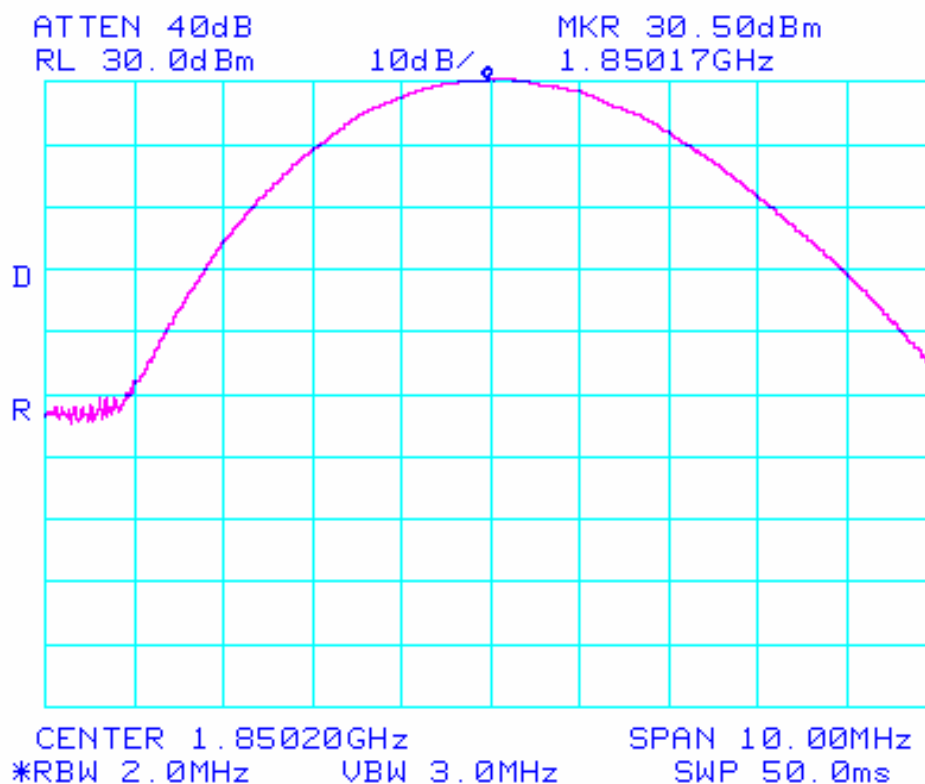


POWER OUT. GSM850 Ch.251

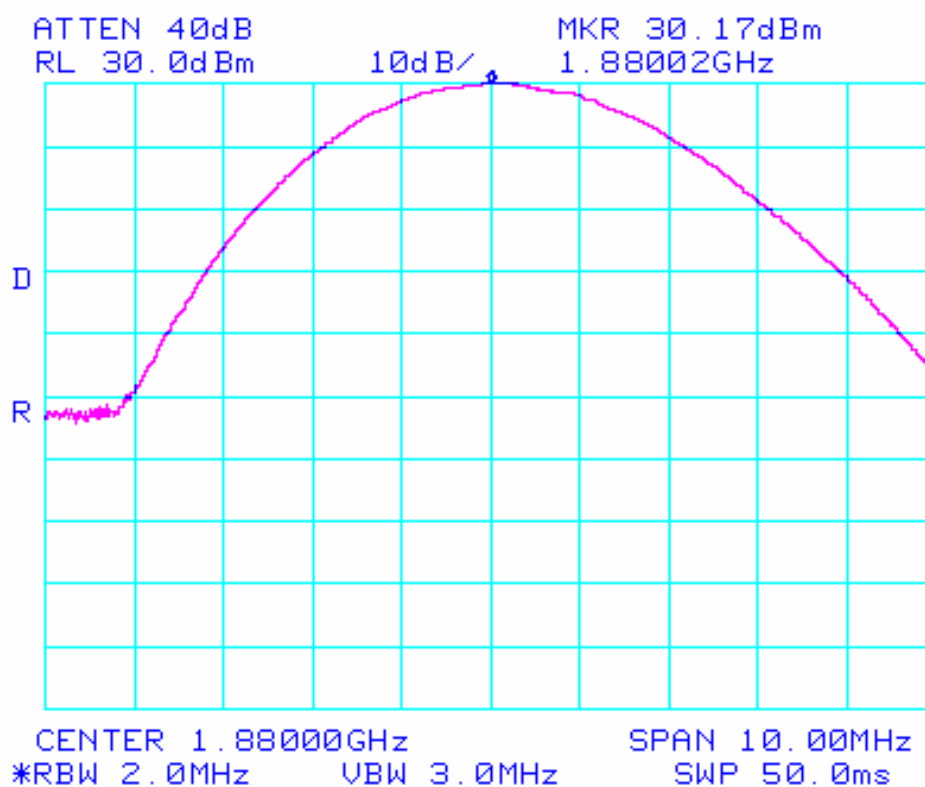




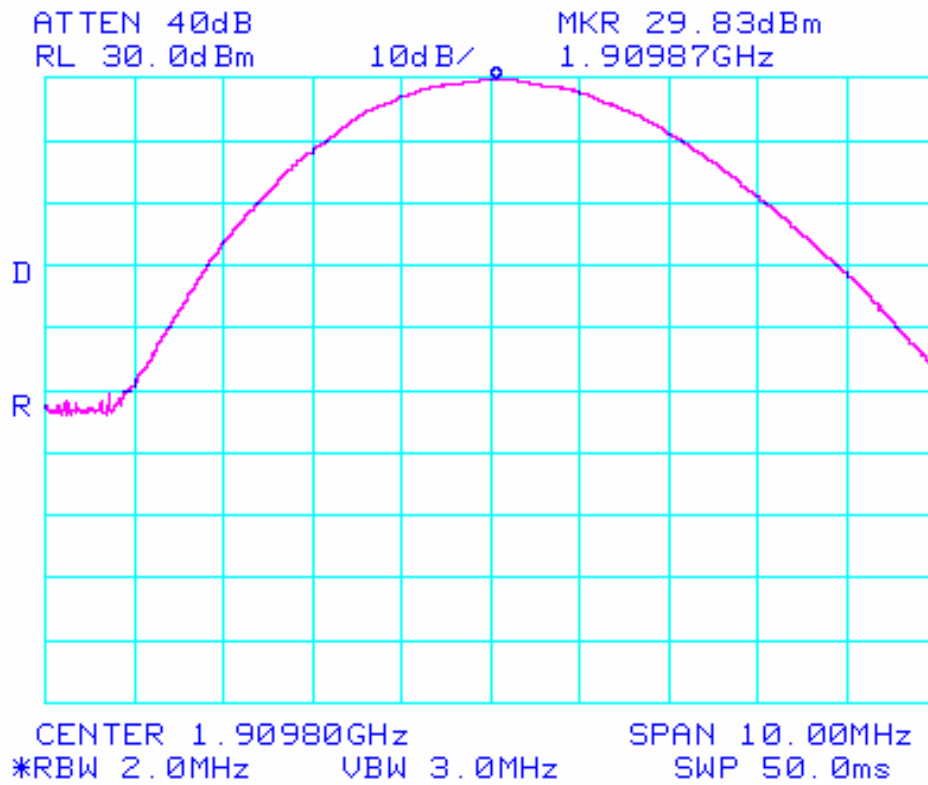
POWER OUT. PCS1900 Ch.512



POWER OUT. PCS1900 Ch.661



POWER OUT. PCS1900 Ch.810



**ERP (GSM850)**

FCC ID : **SBWVK4500**  
 Specification : 47 CFR 22.913(a)  
 Tested Frequency : 824.2MHz, 836.6MHz and 848.8MHz for GSM850  
 RBW=VBW : 3MHz

**Measurement Procedure:****Effective Radiated Power Output Measurements by Substitution Method**

according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turntable 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the dipole is measured. The ERP is recorded.

**Measurement Data:****GSM850**

Channel	Frequency (MHz)	TEST CONDITIONS				Power Step: 5
		Ref. level (dBm)	Pol. (H/V)	ERP (dBm)	ERP (W)	Battery
128	824.2	-10.26	H	27.64	0.581	Standard
<b>190</b>	<b>836.6</b>	<b>-9.56</b>	<b>H</b>	<b>28.69</b>	<b>0.740</b>	<b>Standard</b>
251	848.8	-9.46	H	28.55	0.716	Standard
190	836.6	-9.63	H	28.62	0.728	Extended

**EIRP (PCS1900)**

FCC ID : **SBWVK4500**  
 Specification : 47 CFR 24.232(b)  
 Tested Frequency : 1850.2MHz, 1880.0MHz and 1909.8MHz for PCS1900  
 RBW=VBW : 3MHz

**Measurement Procedure:****Effective Radiated Power Output Measurements by Substitution Method**

according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the Horn antenna is measured. The difference between the gain of the horn and an isotropic antenna is taken into consideration and the EIRP is recorded.

**Measurement Data:****PCS1900**

Channel	Frequency (MHz)	TEST CONDITIONS Power Step: 0				
		Ref. level (dBm)	Pol. (H/V)	EIRP (dBm)	EIRP (W)	Battery
<b>512</b>	<b>1850.2</b>	<b>-13.17</b>	<b>V</b>	<b>29.81</b>	<b>0.957</b>	<b>Standard</b>
661	1880.0	-13.72	V	28.73	0.746	Standard
810	1909.8	-15.04	V	26.95	0.495	Standard
512	1850.2	-13.31	V	29.65	0.923	Extended

### 3.2.2 Occupied Bandwidth

FCC ID	: <b>SBWVK4500</b>
Specification	: 47 CFR 2.1049 (h)(i)
Tested Frequency	: 824.2MHz, 836.6MHz and 848.8MHz for GSM850 1850.2MHz, 1880.0MHz and 1909.8MHz for PCS1900

#### Measurement Procedure:

- The 99% power bandwidth was measured with a calibrated spectrum analyzer.
- Spectrum analyzer plots are included on the following pages.

#### Measurement Data:

##### GSM850

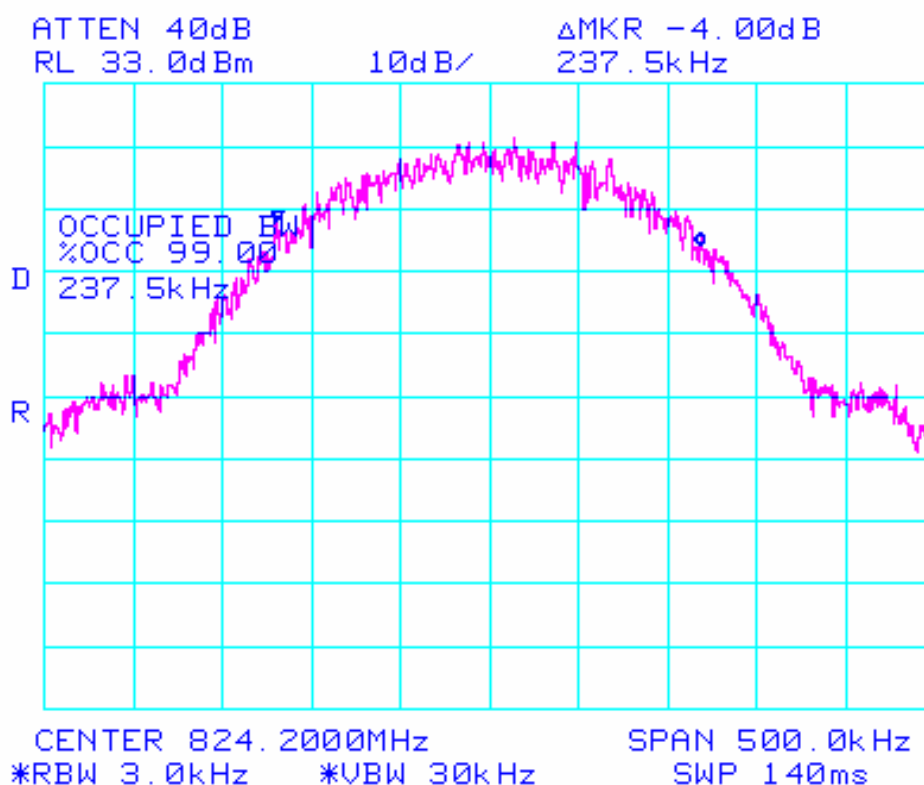
Channel	Frequency (MHz)	99% Bandwidth
		(kHz)
128	824.2	237.5
190	836.6	238.3
251	848.8	238.3

##### PCS1900

Channel	Frequency (MHz)	99% Bandwidth
		(kHz)
512	1850.2	237.5
661	1880.0	241.7
810	1909.8	238.3

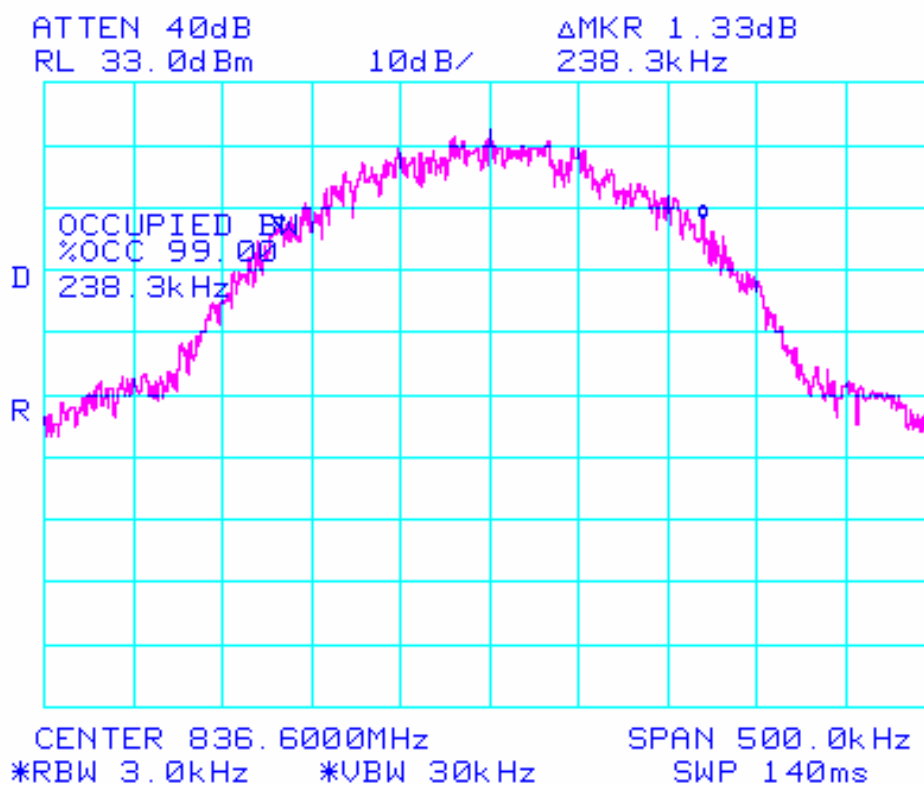
GSM850

99 % Bandwidth Ch. 128



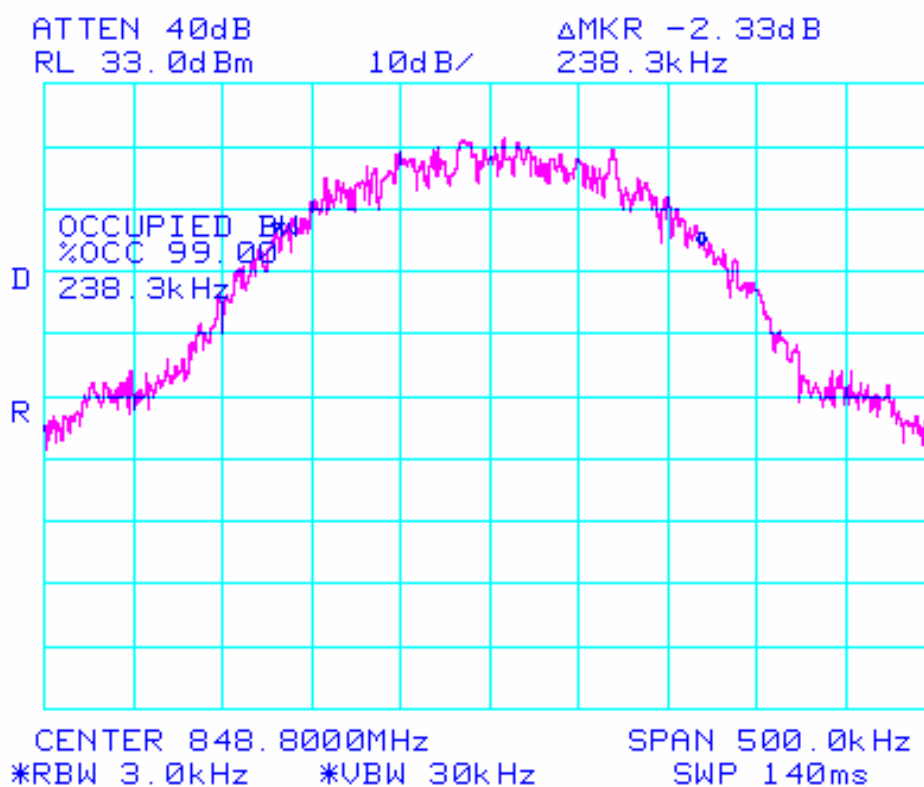
GSM850

99 % Bandwidth Ch. 190



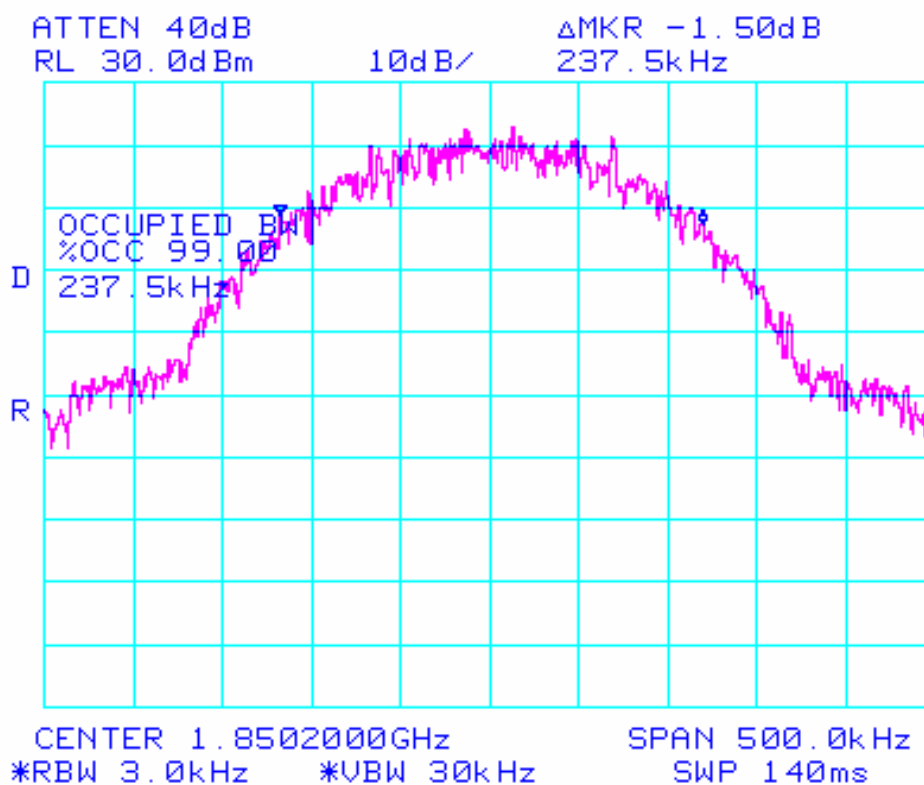
**GSM850**

**99 % Bandwidth Ch. 251**



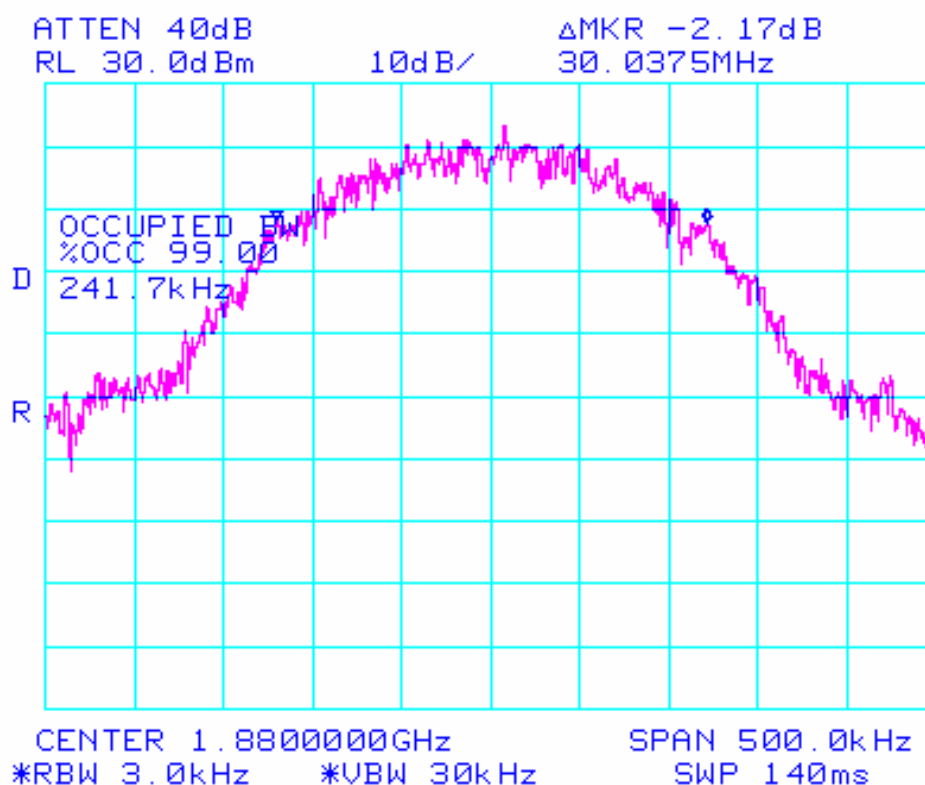
**PCS1900**

**99 % Bandwidth Ch. 512**



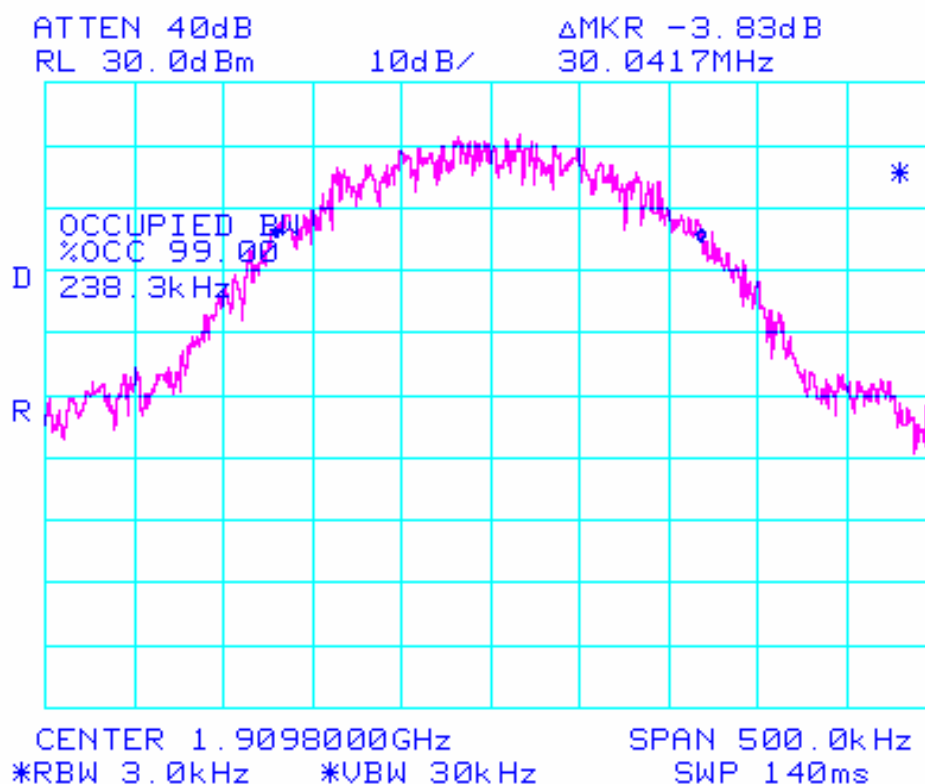
PCS1900

99 % Bandwidth Ch. 661



PCS1900

99 % Bandwidth Ch. 810





### 3.2.3 Occupied Bandwidth Emission Limits

FCC ID	: SBWVK4500
Specification	: 47 CFR 24.238(b)
Tested Frequency	: 824.2MHz, 836.6MHz and 848.8MHz for GSM850 1850.2MHz, 1880.0MHz and 1909.8MHz for PCS1900

#### Measurement Procedure:

- (a) On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least  $43+10\log(P)$  dB.
- (b) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1MHz or greater. However, in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26dB below the transmitter power.
- (c) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.
- The measurement of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.
- Spectrum analyzer plots are included on the following pages.

#### Measurement Data:

##### GSM850

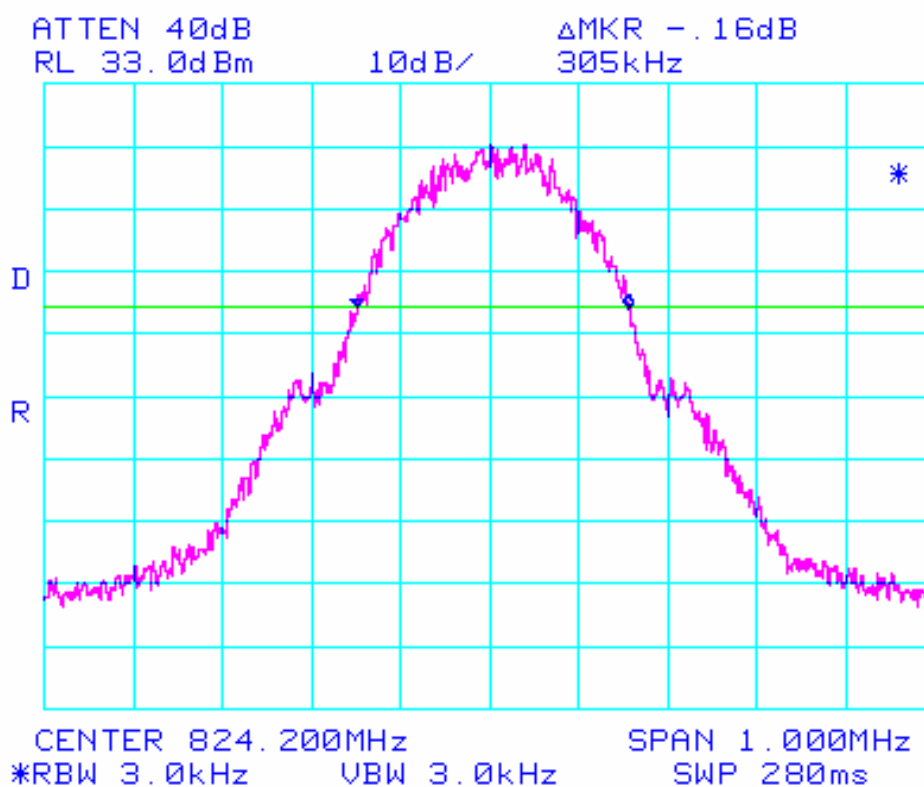
Channel	Frequency (MHz)	-26dBc Bandwidth
		(kHz)
128	824.2	305
190	836.6	303
251	848.8	305

##### PCS1900

Channel	Frequency (MHz)	-26dBc Bandwidth
		(kHz)
512	1850.2	302
661	1880.0	302
810	1909.8	308

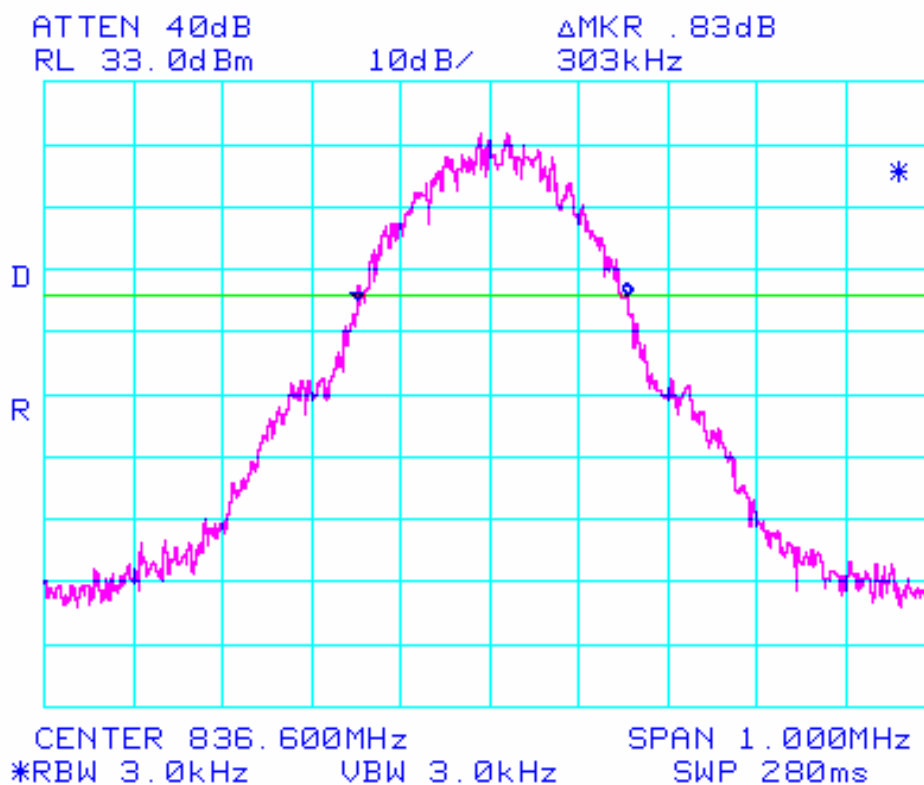
**GSM850**

**-26dBc Bandwidth Ch. 128**



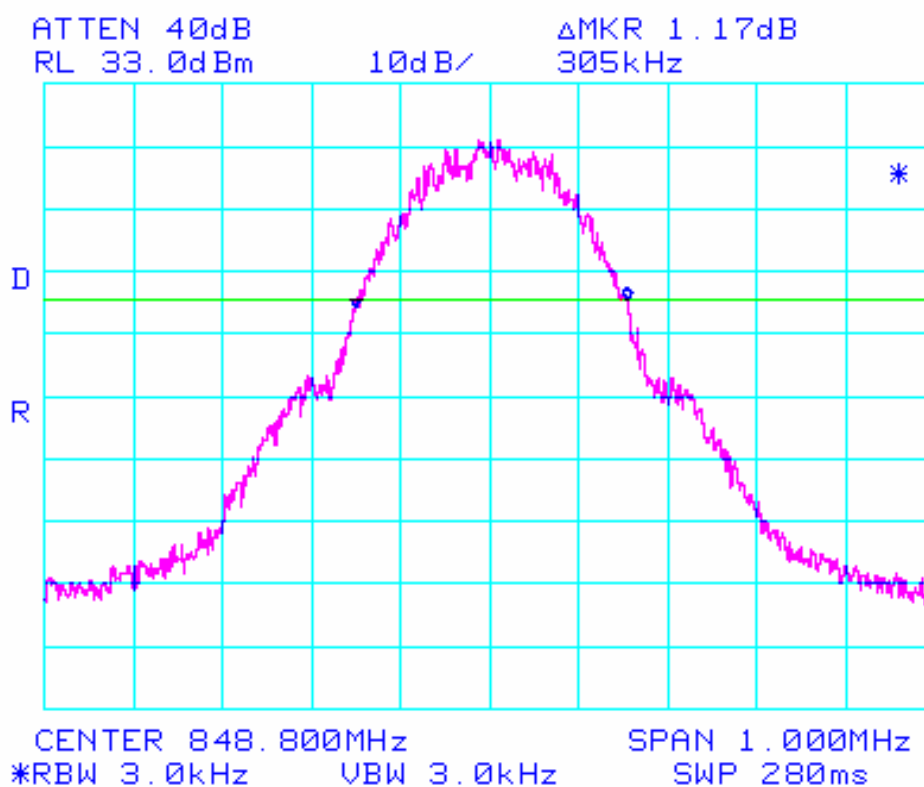
**GSM850**

**-26dBc Bandwidth Ch. 190**



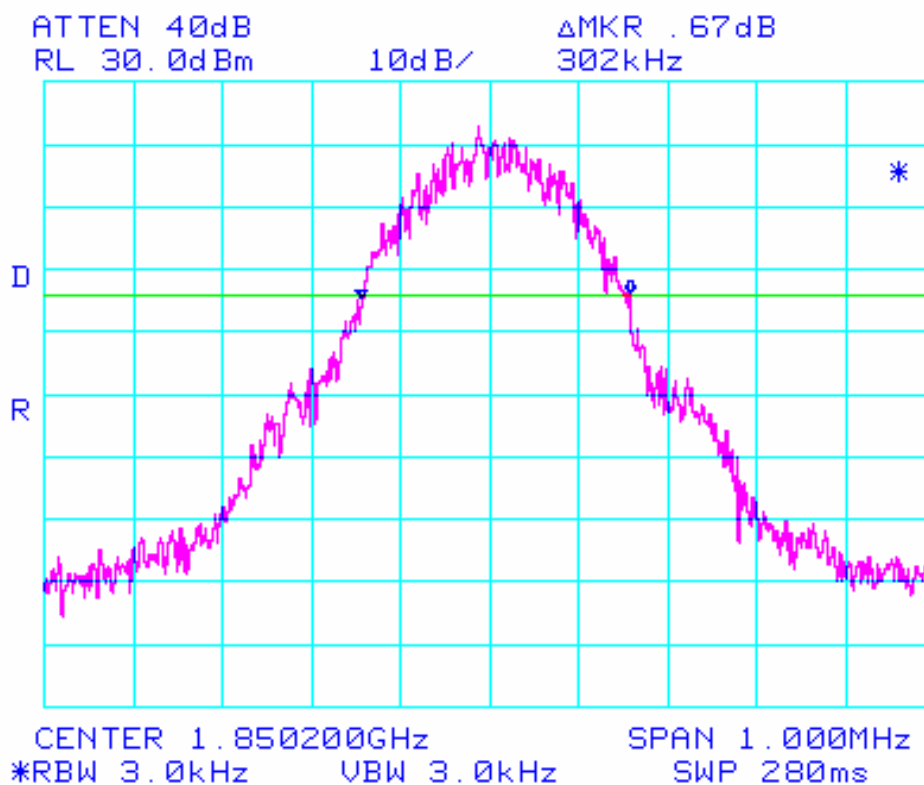
**GSM850**

**-26dBc Bandwidth Ch. 251**



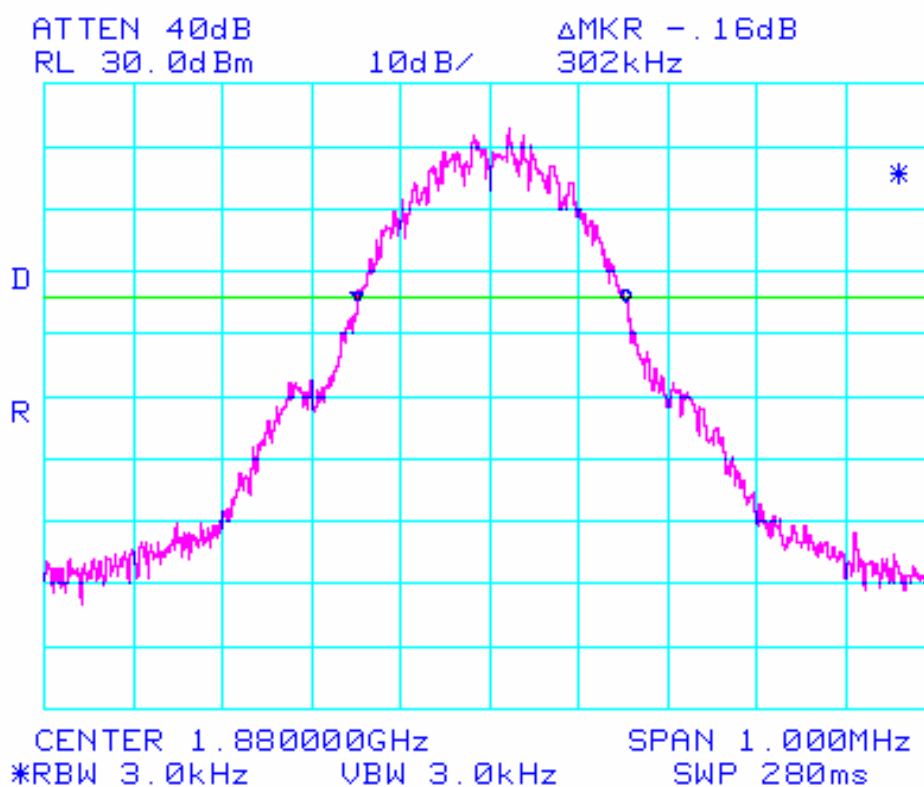
**PCS1900**

**-26dBc Bandwidth Ch. 512**



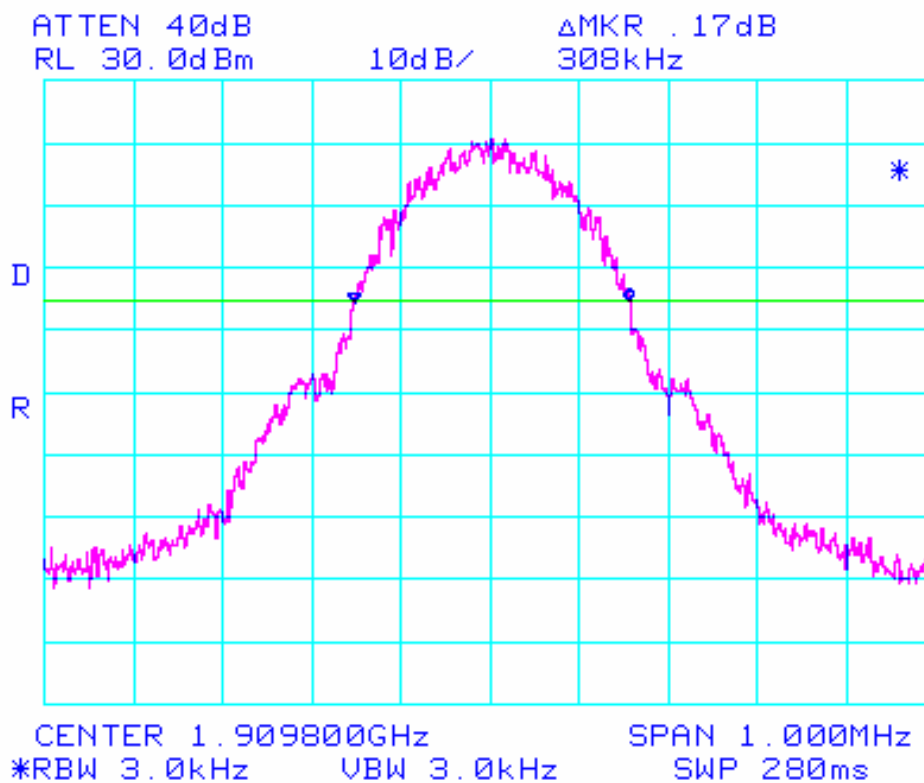
PCS1900

-26dBc Bandwidth Ch. 661



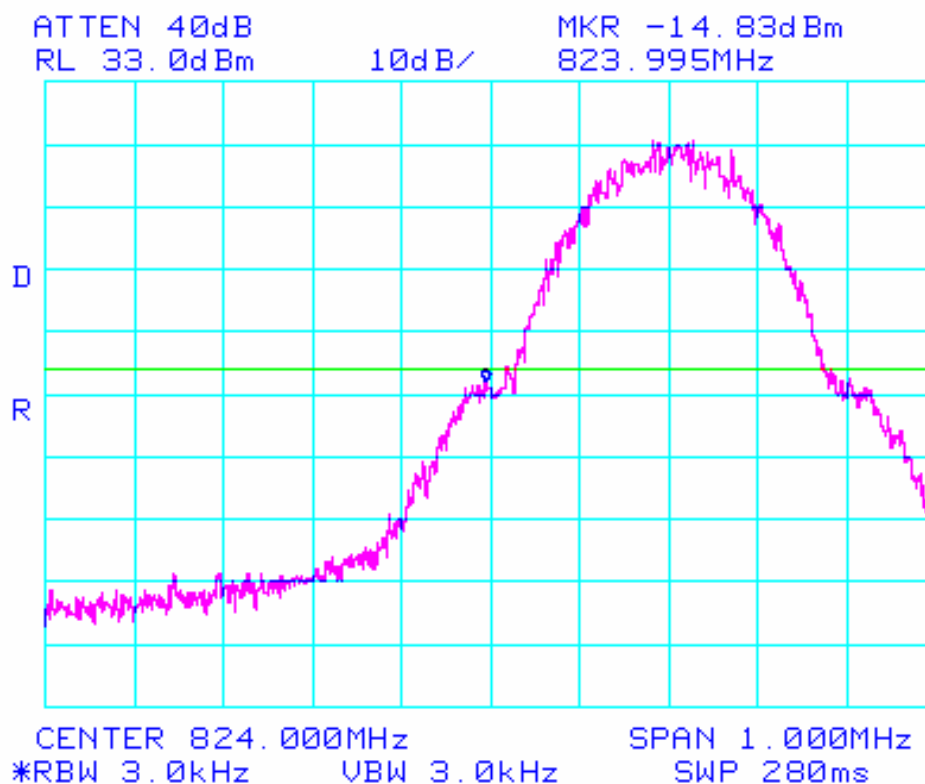
PCS1900

-26dBc Bandwidth Ch. 810



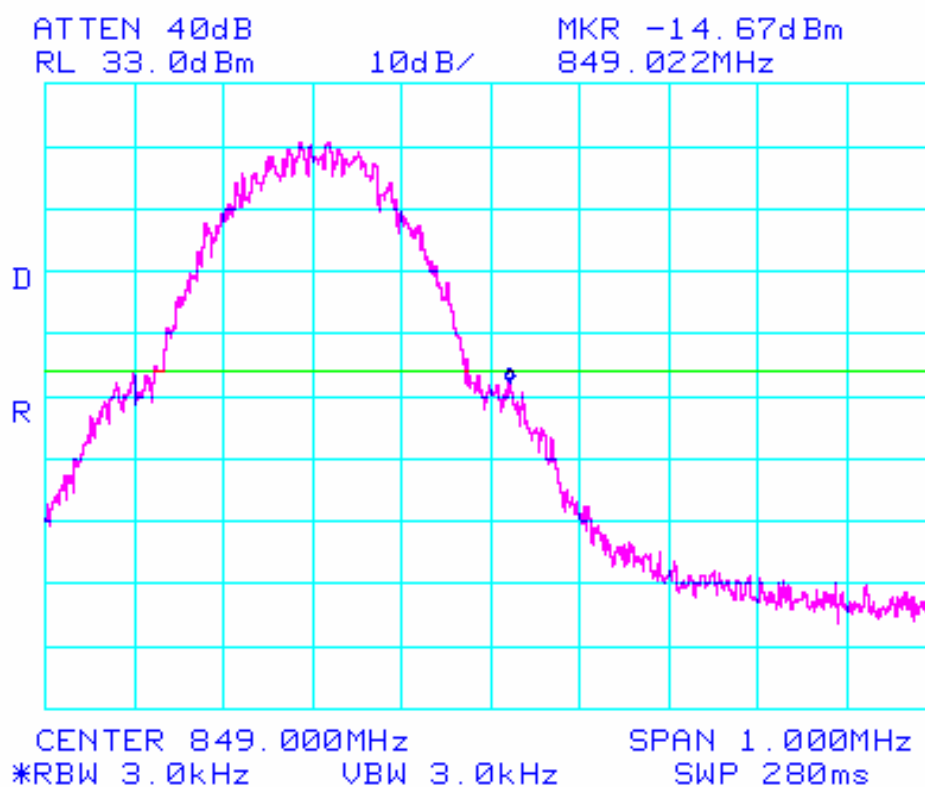
**GSM850**

**Band Edge Ch. 128**



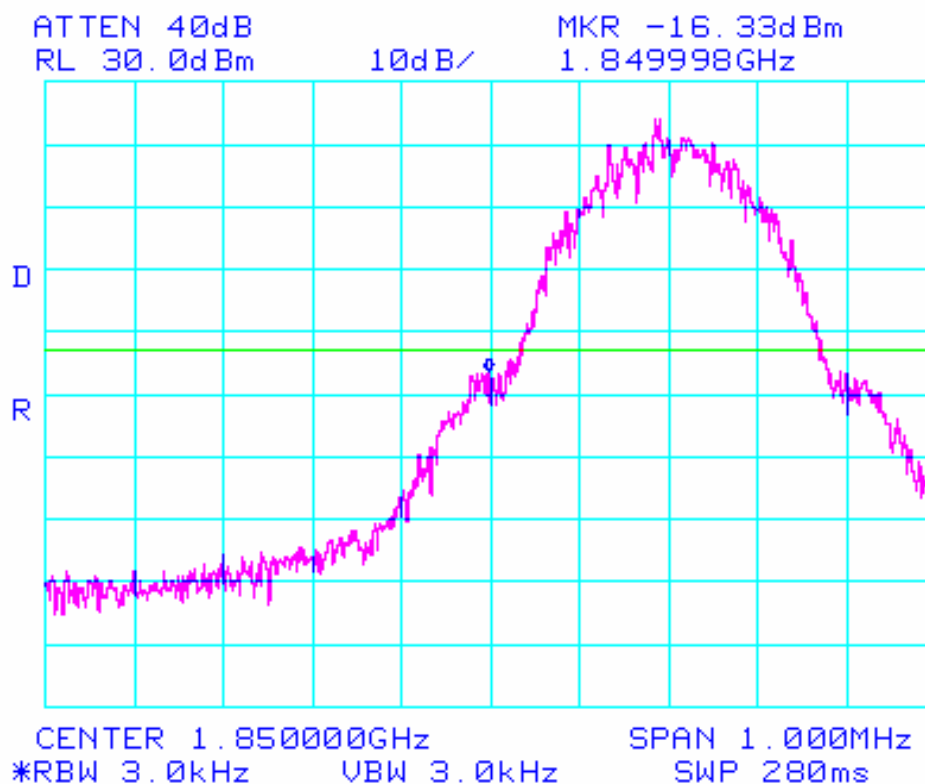
**GSM850**

**Band Edge Ch. 251**



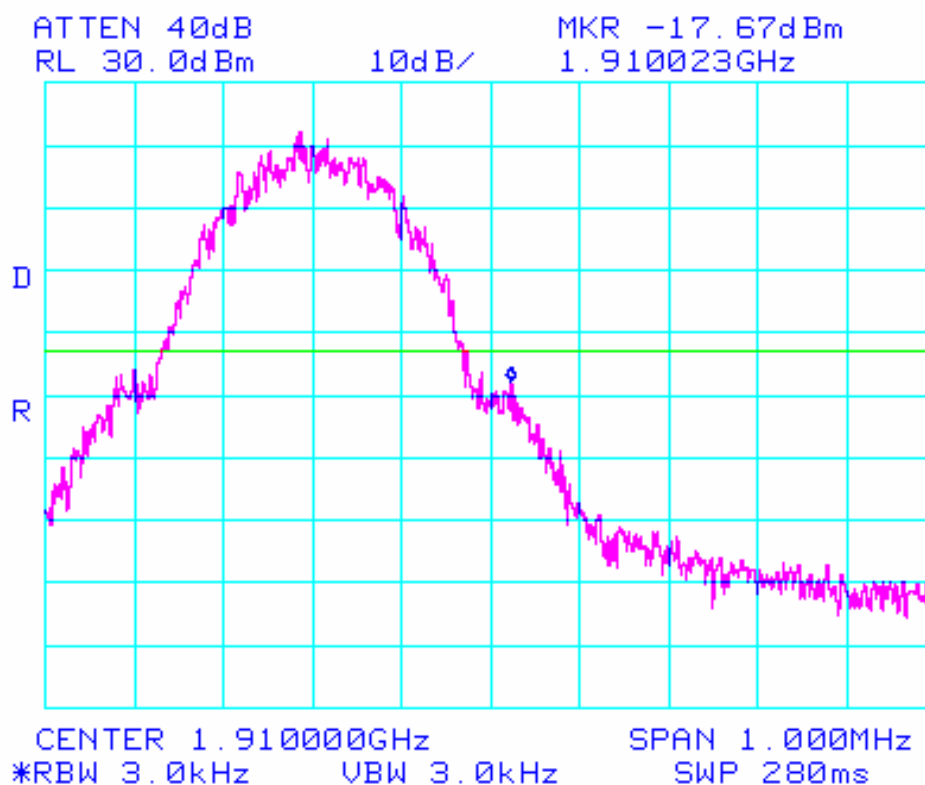
PCS1900

Band Edge Ch. 512



PCS1900

Band Edge Ch. 810



### 3.2.4 Spurious and Harmonic Emissions at Antenna Terminal

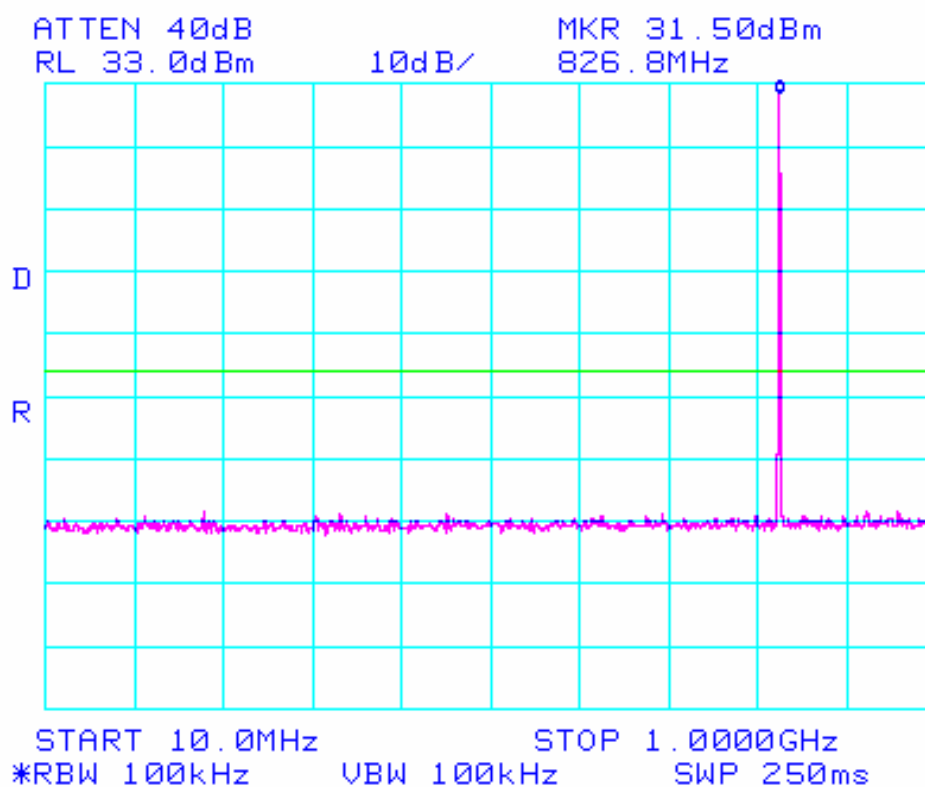
FCC ID	: SBWVK4500
Specification	: 47 CFR 2.1051, 24.238(a)
Tested Frequency	: 824.2MHz, 836.6MHz and 848.8MHz for GSM850 1850.2MHz, 1880.0MHz and 1909.8MHz for PCS1900

#### Measurement Procedure:

- The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer.
- The spectrum is scanned from the lowest frequency generated in the equipment up to 10'th harmonics of the highest frequency.
- Spectrum analyzer plots are included on the following pages.

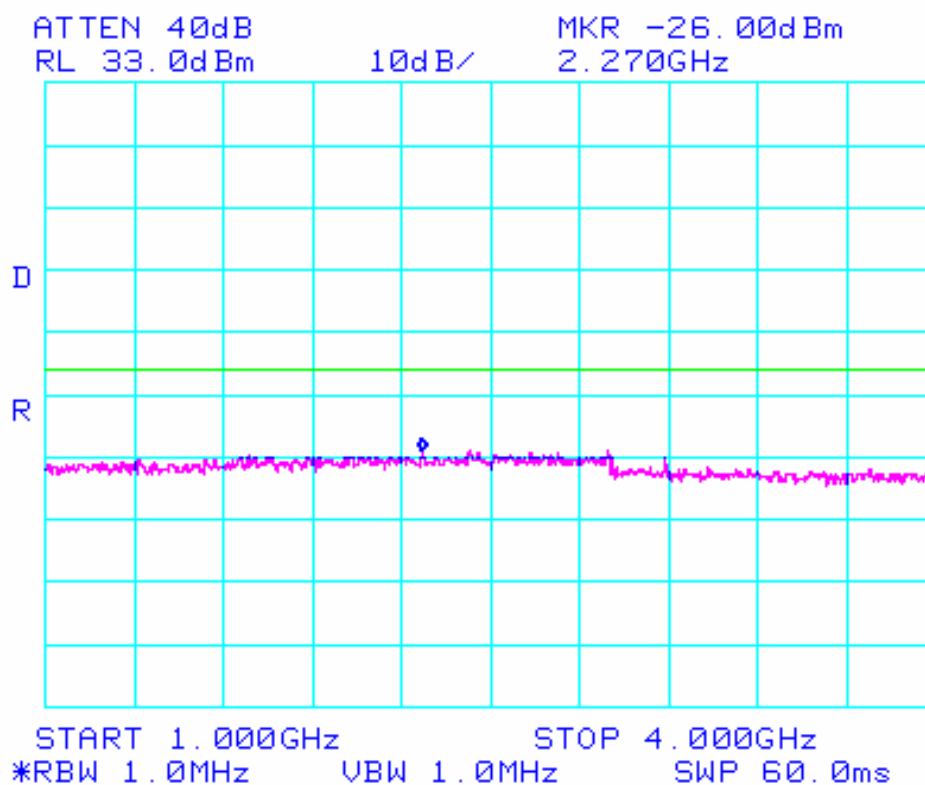
**GSM850**

**Spurious Emissions at Antenna Terminal / Ch.128 -1**



**GSM850**

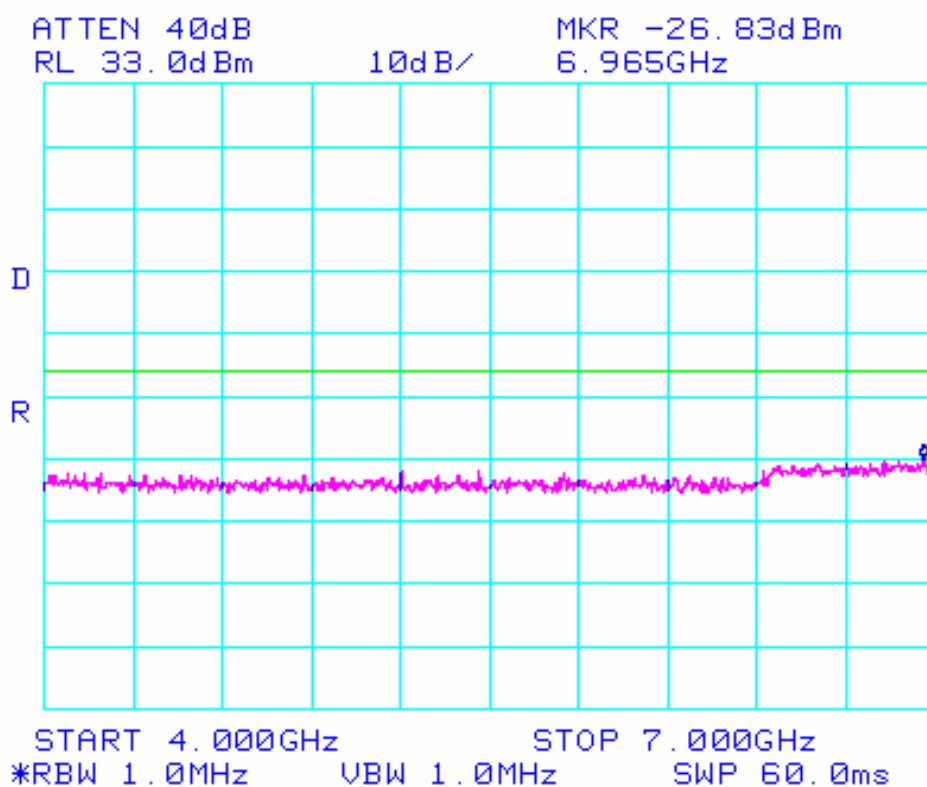
**Spurious Emissions at Antenna Terminal / Ch.128 -2**





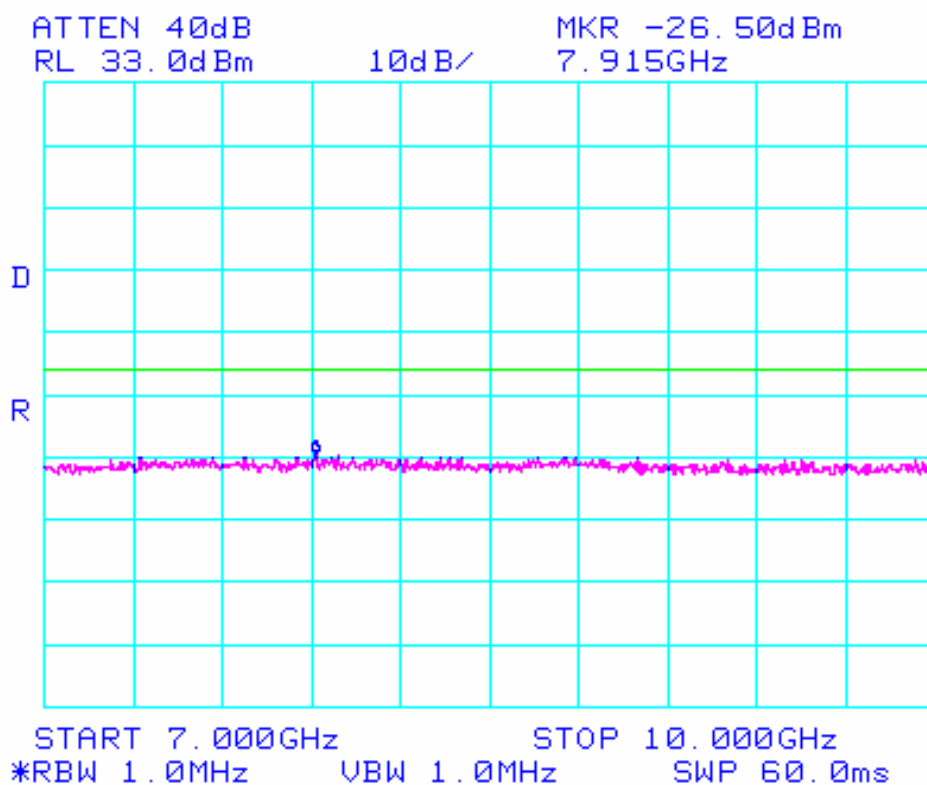
**GSM850**

**Spurious Emissions at Antenna Terminal / Ch.128-3**



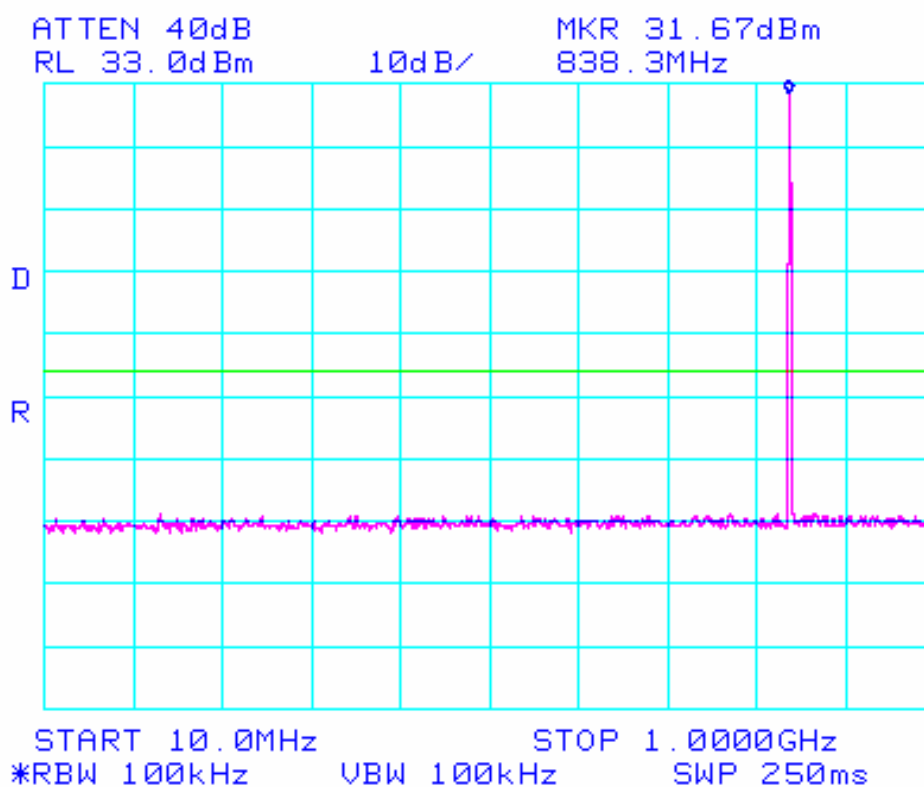
**GSM850**

**Spurious Emissions at Antenna Terminal / Ch.128-4**



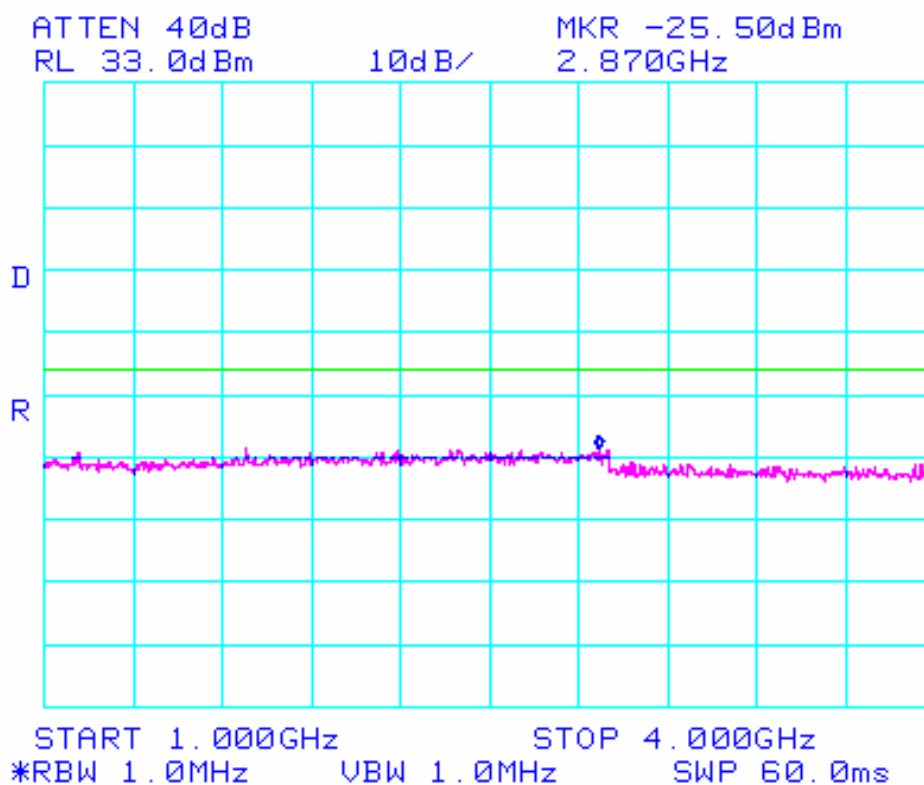
**GSM850**

**Spurious Emissions at Antenna Terminal / Ch.190 -1**



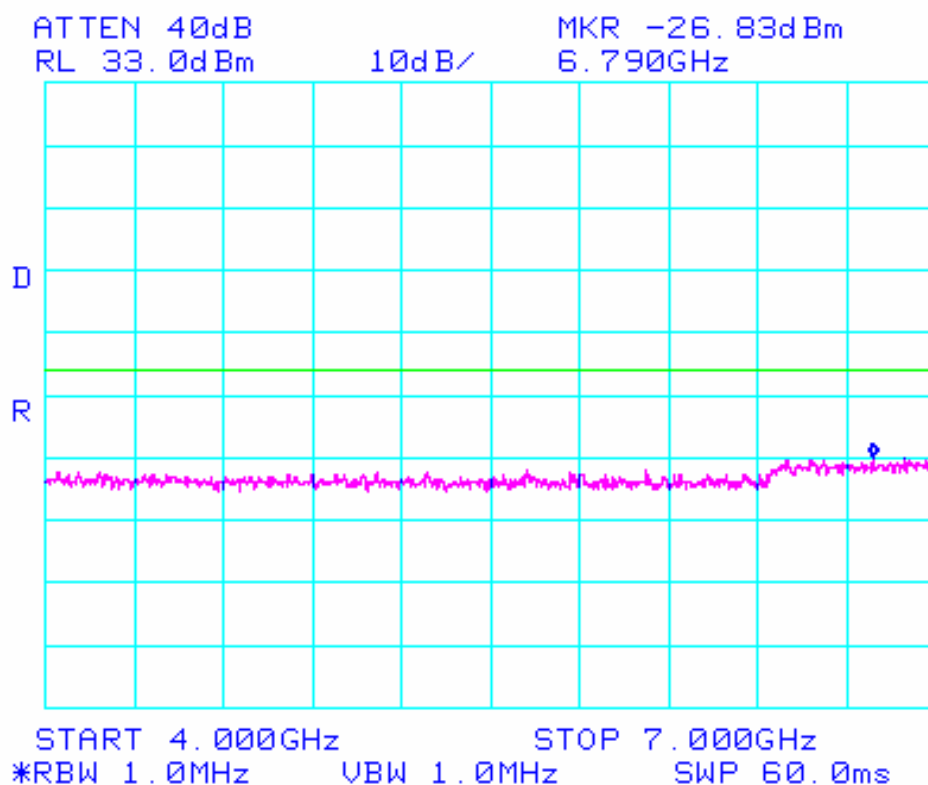
**GSM850**

**Spurious Emissions at Antenna Terminal / Ch.190-2**



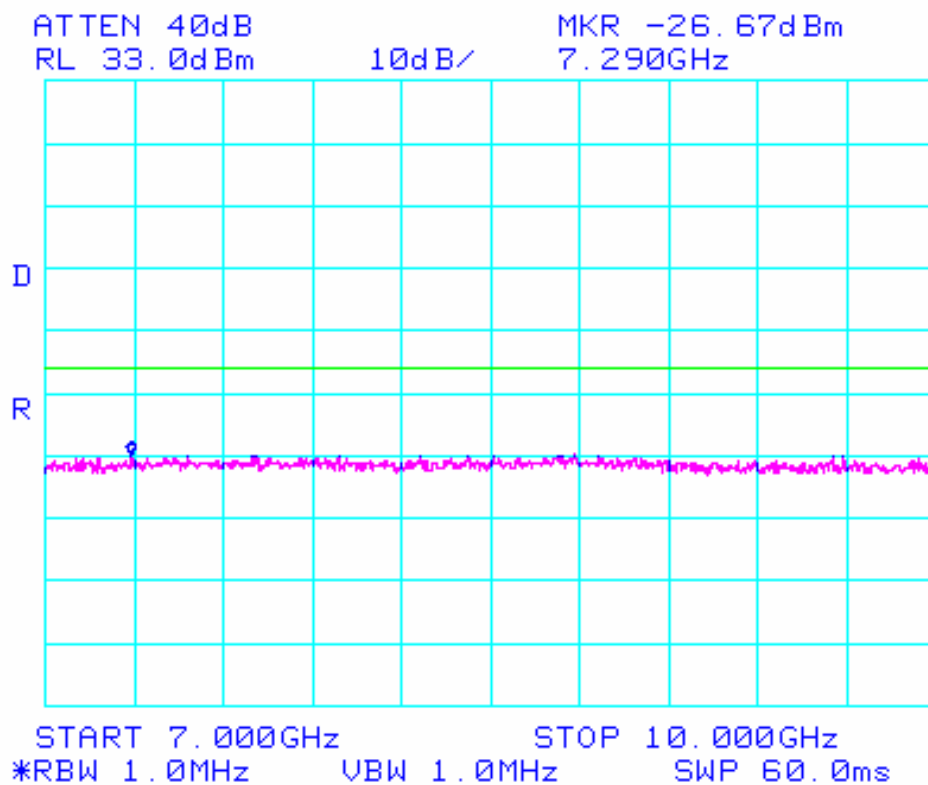
GSM850

Spurious Emissions at Antenna Terminal / Ch.190-3



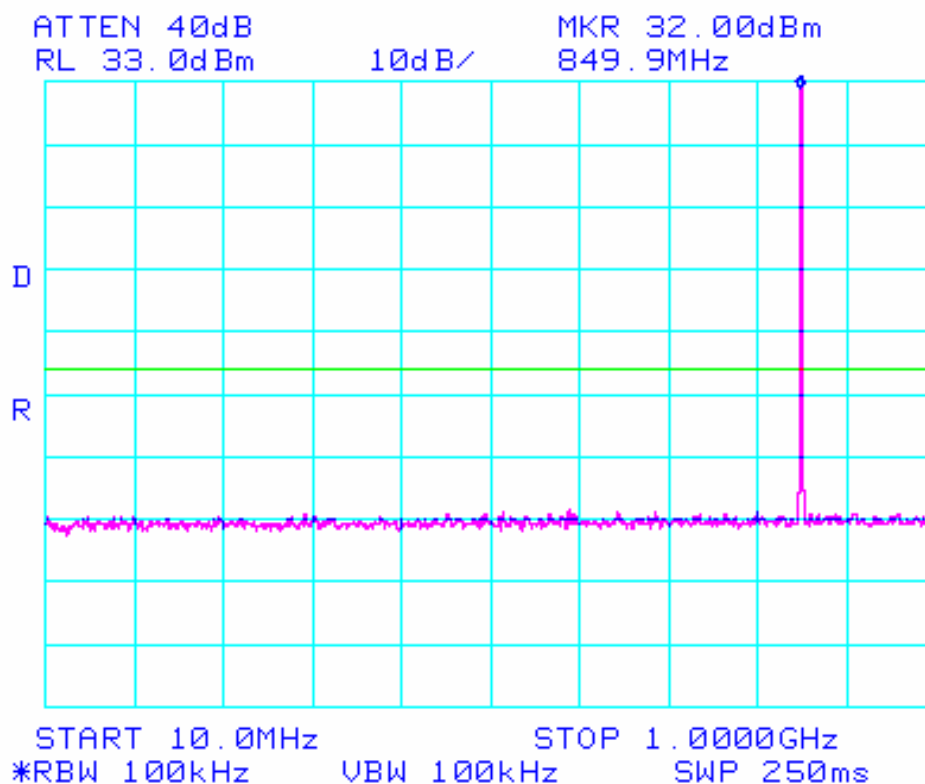
GSM850

Spurious Emissions at Antenna Terminal / Ch.190-4



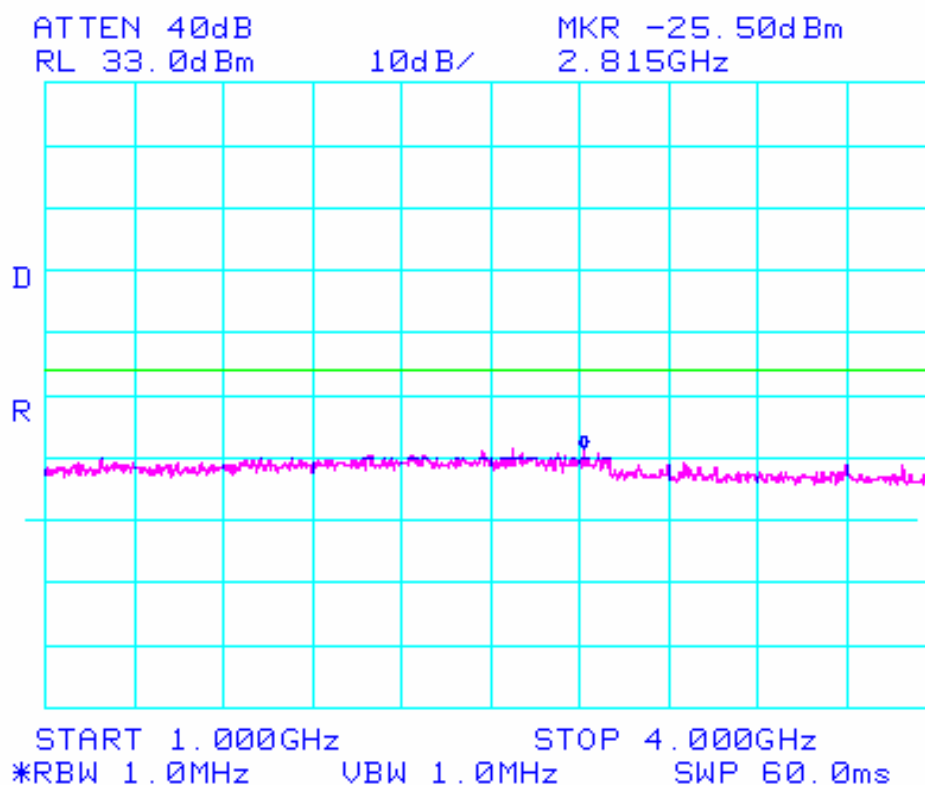
GSM850

Spurious Emissions at Antenna Terminal / Ch.251-1



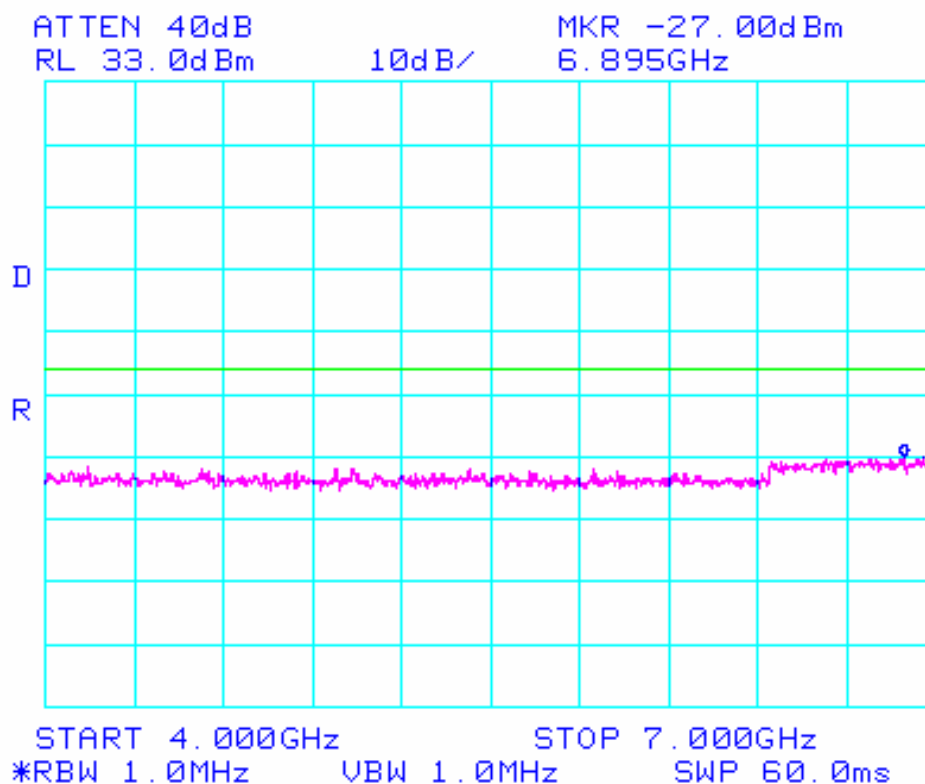
GSM850

Spurious Emissions at Antenna Terminal / Ch.251-2



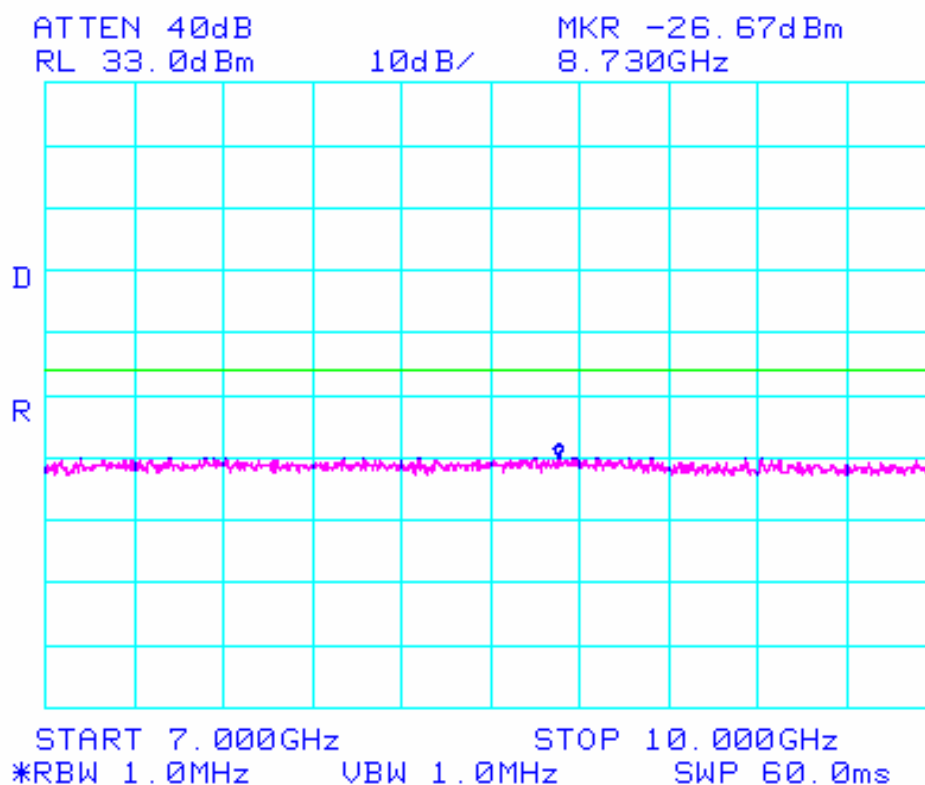
**GSM850**

**Spurious Emissions at Antenna Terminal / Ch.251-3**



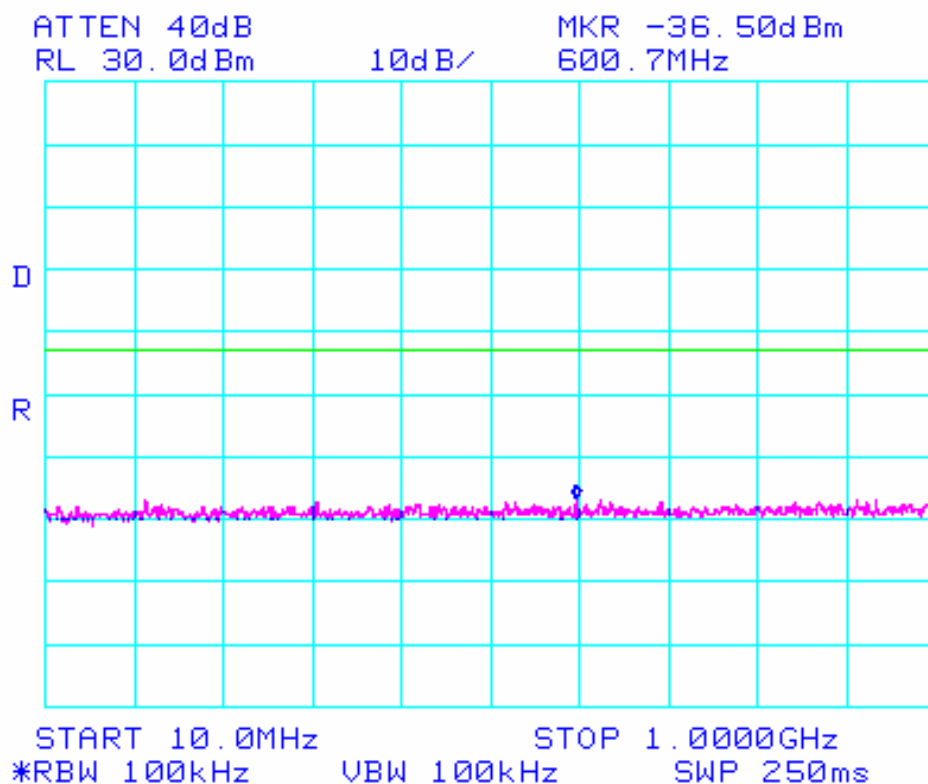
**GSM850**

**Spurious Emissions at Antenna Terminal / Ch.251-4**



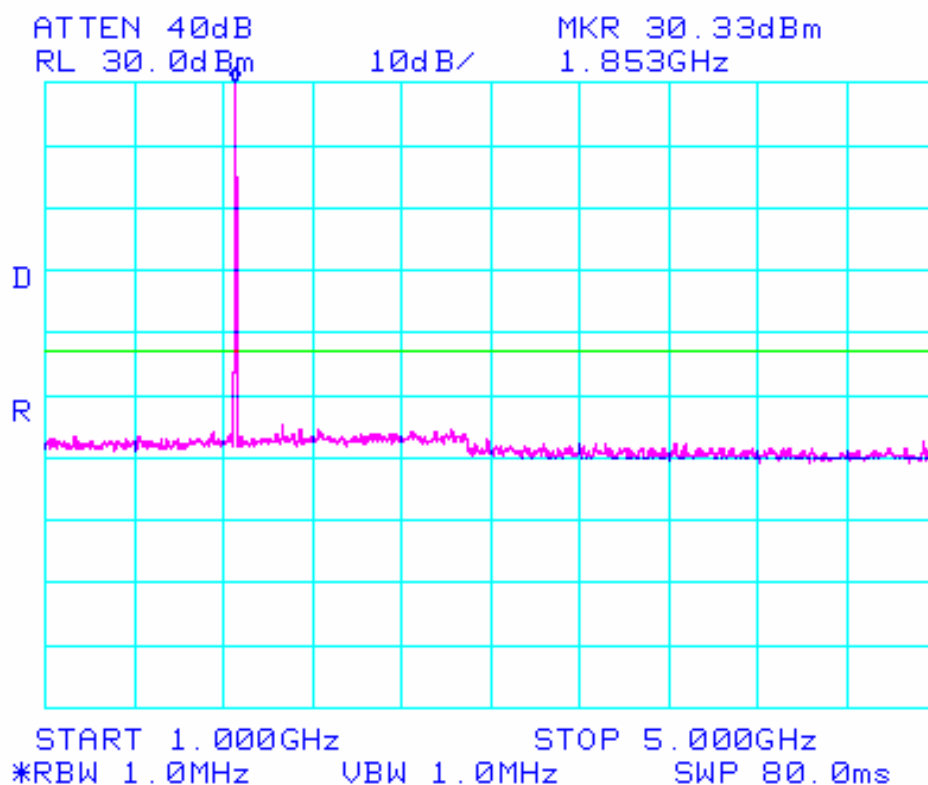
PCS1900

Spurious Emissions at Antenna Terminal / Ch.512-1



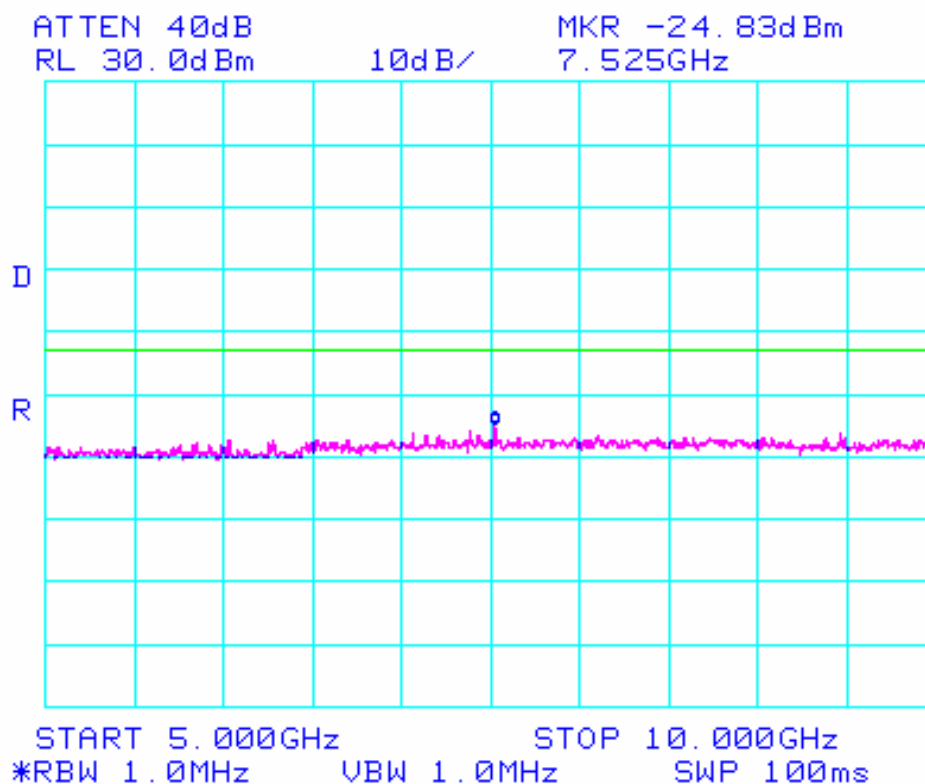
PCS1900

Spurious Emissions at Antenna Terminal / Ch.512-2



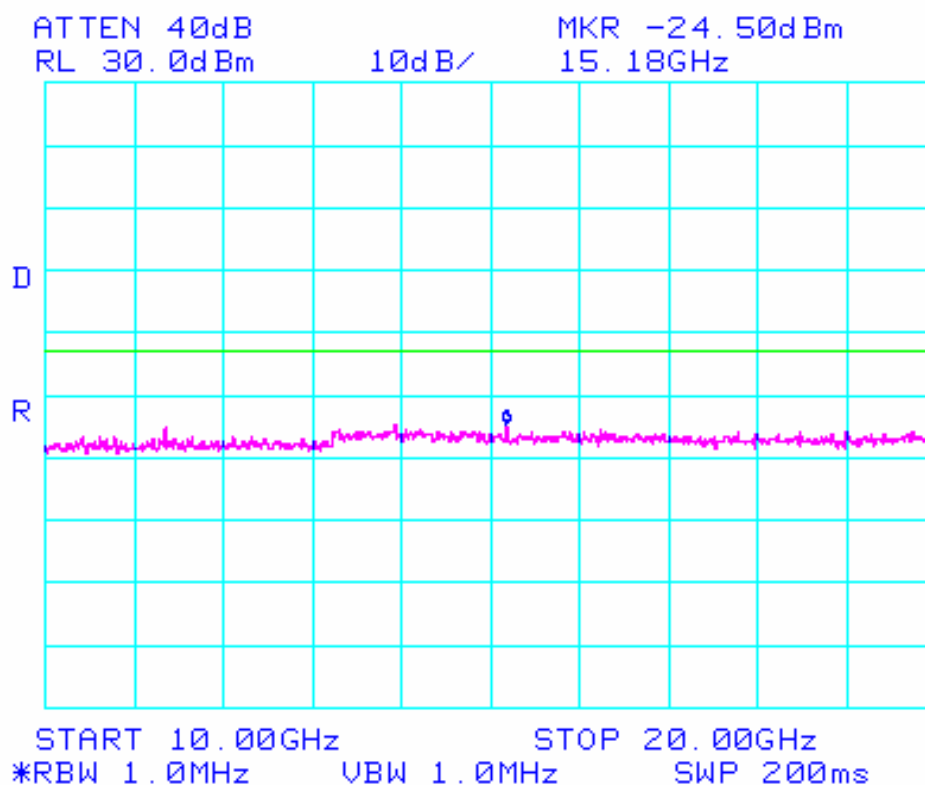
PCS1900

Spurious Emissions at Antenna Terminal / Ch.512-3



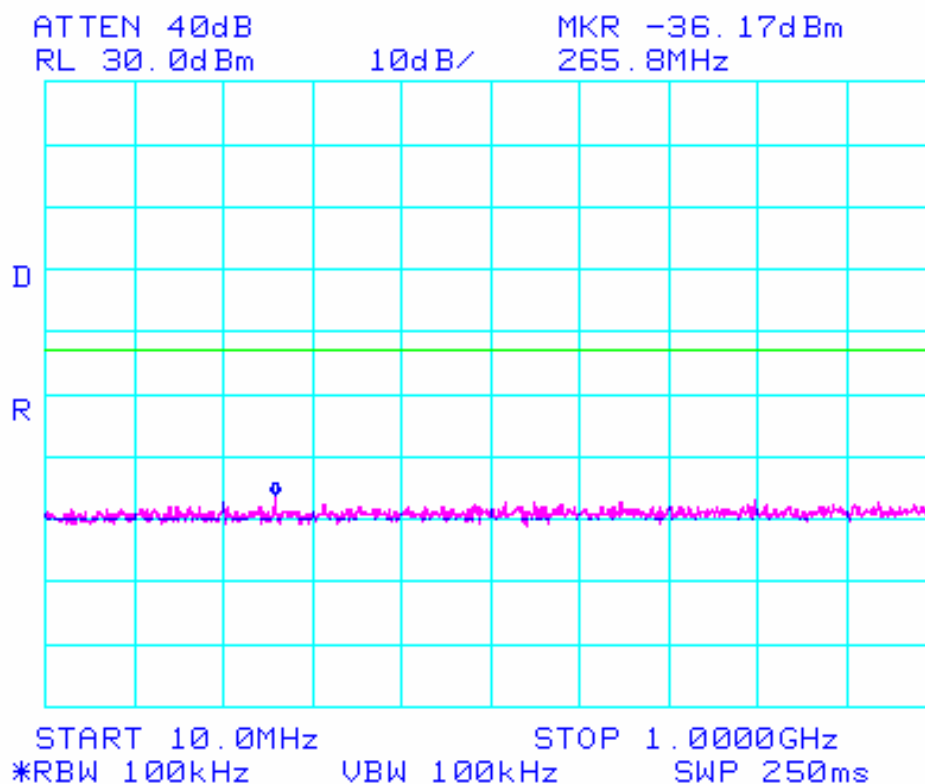
PCS1900

Spurious Emissions at Antenna Terminal / Ch.512-4



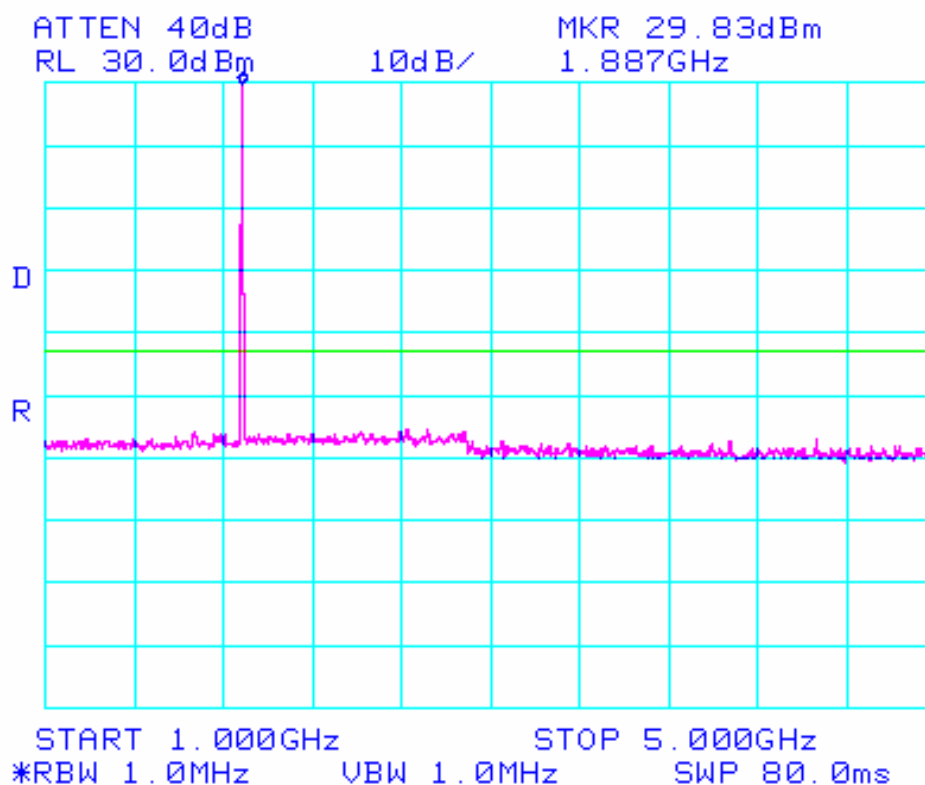
PCS1900

Spurious Emissions at Antenna Terminal / Ch.661-1



PCS1900

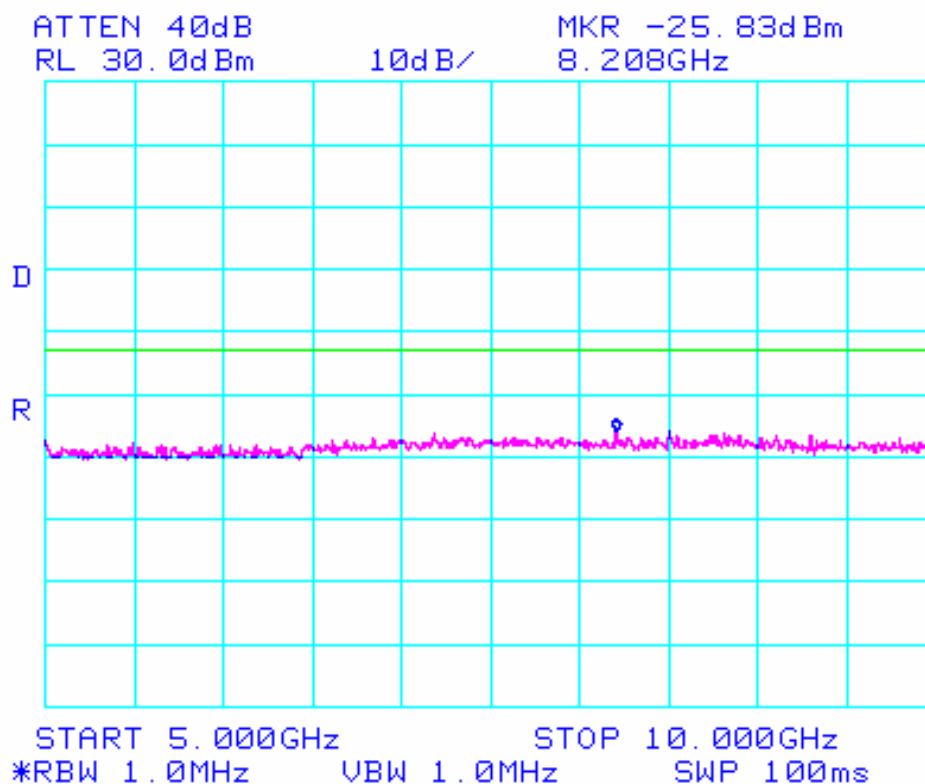
Spurious Emissions at Antenna Terminal / Ch.661-2





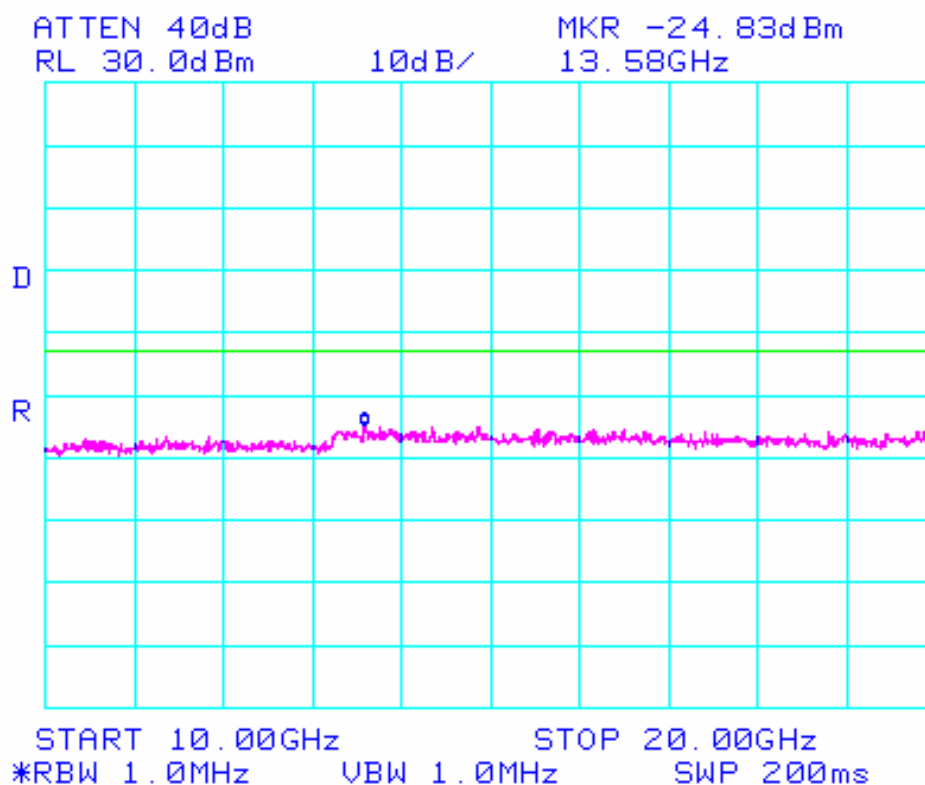
PCS1900

Spurious Emissions at Antenna Terminal / Ch.661-3



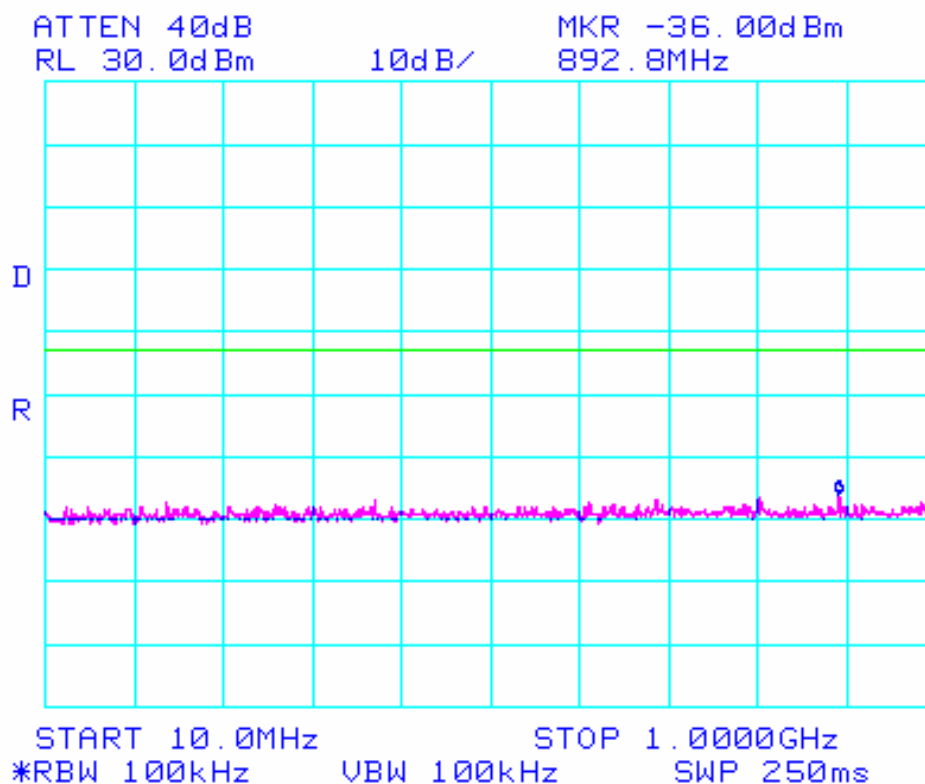
PCS1900

Spurious Emissions at Antenna Terminal / Ch.661-4



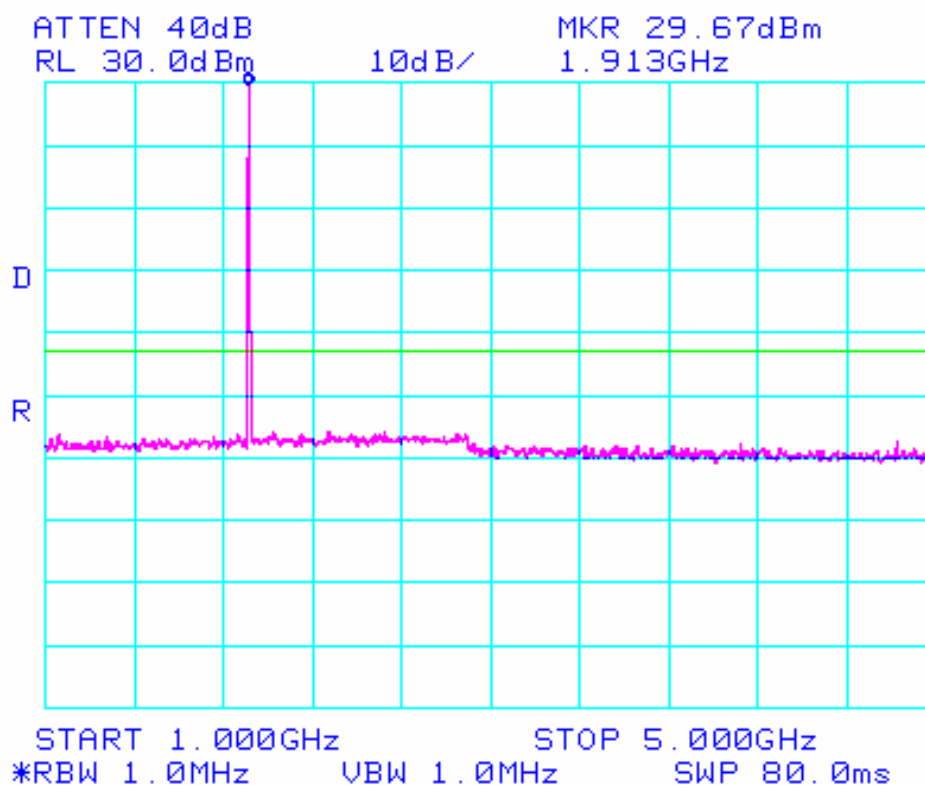
PCS1900

Spurious Emissions at Antenna Terminal / Ch.810-1



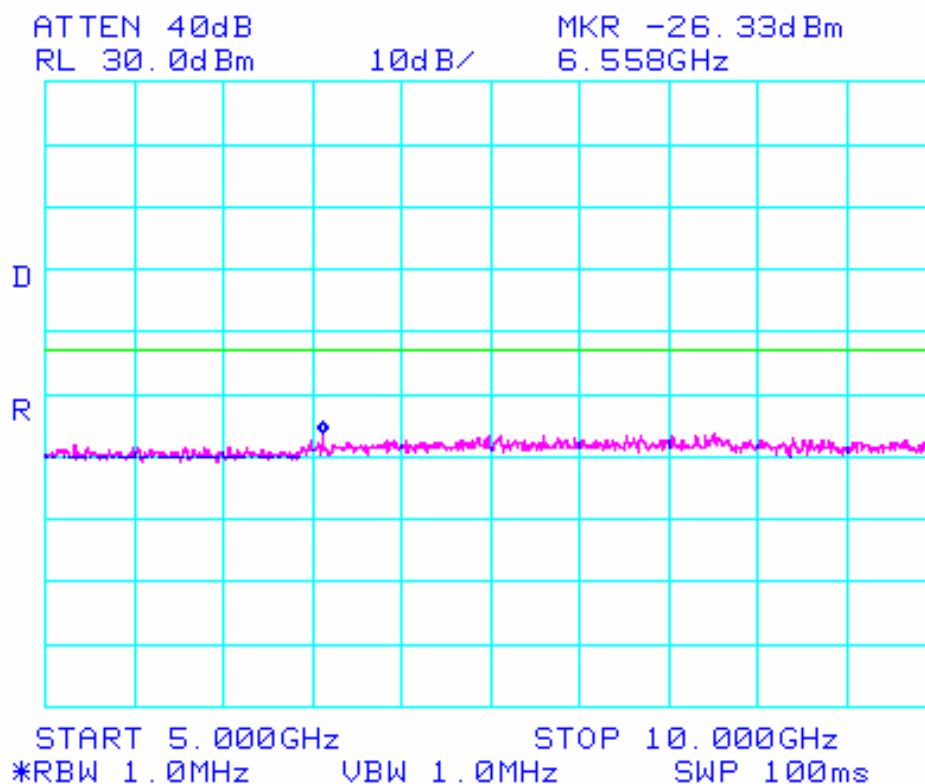
PCS1900

Spurious Emissions at Antenna Terminal / Ch.810-2



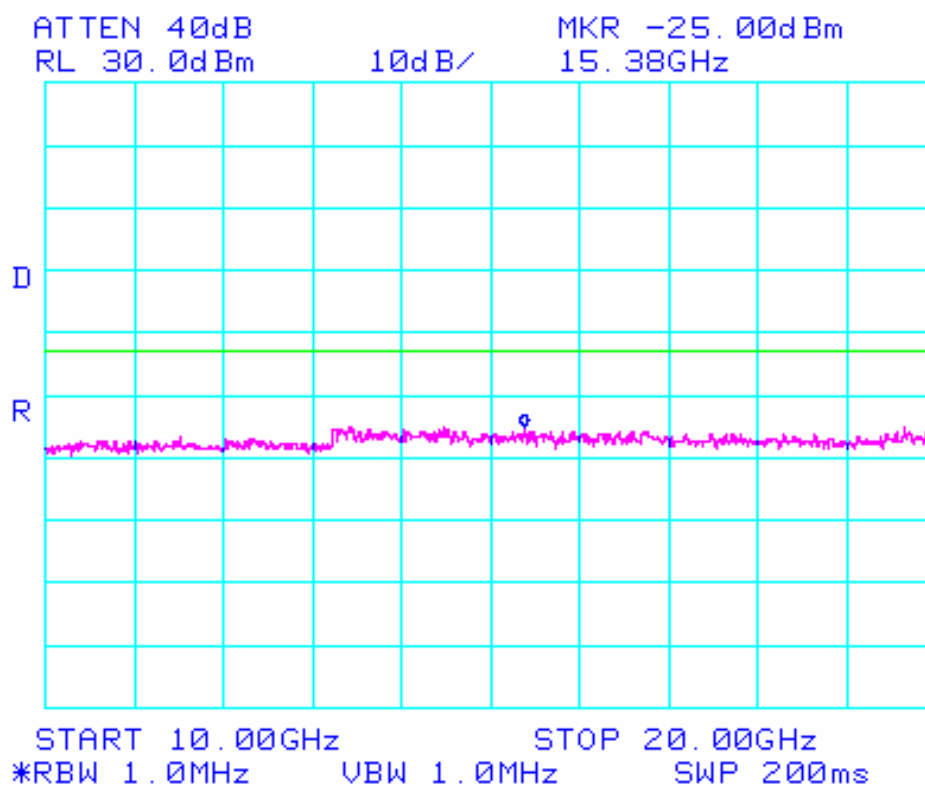
PCS1900

Spurious Emissions at Antenna Terminal / Ch.810-3



PCS1900

Spurious Emissions at Antenna Terminal / Ch.810-4



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### 3.2.5 Field Strength of Spurious Radiation

FCC ID	:	<b>SBWVK4500</b>
Specification	:	47 CFR 2.1053(a)
Tested Frequency	:	824.2MHz, 836.6MHz and 848.8MHz for GSM850 1850.2MHz, 1880.0MHz and 1909.8MHz for PCS1900

#### Measurement Procedure:

- Radiation and harmonic emissions are measured outdoors at our 3-meter test range. The equipment under test is placed on a wooden turntable 3-meters from the receive antenna.  
The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer reading. This level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

**GSM850 Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY : 824.2 MHz  
 CHANNEL : 128(Low)  
 MEASURED OUTPUT POWER : 28.69 dBm = 0.740 W  
 MODULATION SIGNAL : GSM (Internal)  
 DISTANCE : 3 meters  
 LIMIT :  $43 + 10 \log_{10} (W) = 41.69$  dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
-	-	-	-	-	-
No emissions were detected at a level greater than 10dB below limit.					
-	-	-	-	-	-

**NOTE**

Radiated Spurious Emission Measurements by Substitution Method  
 according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

**GSM850 Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY : 836.6 MHz  
 CHANNEL : 190(Mid)  
 MEASURED OUTPUT POWER : 28.69 dBm = 0.740 W  
 MODULATION SIGNAL : GSM (Internal)  
 DISTANCE : 3 meters  
 LIMIT :  $43 + 10 \log_{10} (W) = 41.69$  dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
-	-	-	-	-	-
No emissions were detected at a level greater than 10dB below limit.					
-	-	-	-	-	-

**NOTE**

Radiated Spurious Emission Measurements by Substitution Method  
 according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

**GSM850 Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY : 848.8 MHz  
 CHANNEL : 251(High)  
 MEASURED OUTPUT POWER : 28.69 dBm = 0.740 W  
 MODULATION SIGNAL : GSM (Internal)  
 DISTANCE : 3 meters  
 LIMIT :  $43 + 10 \log_{10} (W) =$  41.69 dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
-	-	-	-	-	-
No emissions were detected at a level greater than 10dB below limit.					
-	-	-	-	-	-

**NOTE**

Radiated Spurious Emission Measurements by Substitution Method  
according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

**PCS1900 Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY : 1850.2 MHz  
 CHANNEL : 512(Low)  
 MEASURED OUTPUT POWER : 29.81 dBm = 0.957 W  
 MODULATION SIGNAL : GSM (Internal)  
 DISTANCE : 3 meters  
 LIMIT :  $43 + 10 \log_{10} (W) =$  42.81 dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
-	-	-	-	-	-
No emissions were detected at a level greater than 10dB below limit.					
-	-	-	-	-	-

**NOTE**

Radiated Spurious Emission Measurements by Substitution Method  
according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.



**PCS1900 Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY : 1880.0 MHz  
 CHANNEL : 661(Mid)  
 MEASURED OUTPUT POWER : 29.81 dBm = 0.957 W  
 MODULATION SIGNAL : GSM (Internal)  
 DISTANCE : 3 meters  
 LIMIT :  $43 + 10 \log_{10} (W)$  = 42.81 dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
-	-	-	-	-	-
No emissions were detected at a level greater than 10dB below limit.					
-	-	-	-	-	-

**NOTE**

Radiated Spurious Emission Measurements by Substitution Method  
 according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

**PCS1900 Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY : 1909.8 MHz  
CHANNEL : 810(High)  
MEASURED OUTPUT POWER : 29.81 dBm = 0.957 W  
MODULATION SIGNAL : GSM (Internal)  
DISTANCE : 3 meters  
LIMIT :  $43 + 10 \log_{10} (W) =$  42.81 dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
-	-	-	-	-	-
No emissions were detected at a level greater than 10dB below limit.					
-	-	-	-	-	-

**NOTE**

Radiated Spurious Emission Measurements by Substitution Method  
according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

### 3.2.6 Frequency Stability/Temperature Variation.

FCC ID	: <b>SBWVK4500</b>
Specification	: 47 CFR 2.1055 , 24.235
Tested Frequency	: 836.6MHz for GSM850 1880.0MHz for PCS1900

#### Measurement Procedure:

The frequency stability of the transmitter is measured by:

- a) **Temperature** :The temperature is varied from -30°C to + 60°C using an environmental chamber.
- b) **Primary Supply Voltage** :The primary supply voltage is varied from 85% to 115% of the voltage Normally at the input to the device or at the power supply terminals if cables are not normally supplied.

Specification –The minimum frequency stability shall be +/- 0.00025% at any time during normal operation.

Specification — The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5\text{ppm}$ ) of the center frequency.

#### Time Period and Procedure:

1. The carrier frequency of the transmitter and the individual oscillators is measured at room temperature (25°C to 27 °C to provide a reference)
2. The equipment is subjected to an overnight “soak” at -30°C without any power applied.
3. After the overnight ”soak” at -30°C(usually 14-16 hours),the equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency to the transmitter and the individual oscillators is made within a three minute interval after applying power to the transmitter.
4. Frequency measurements is made at 10°C interval up to room temperature. At least a period of one and one half hour is provided to allow stabilization of the equipment at each temperature level.
5. Again the transmitter carrier frequency and the individual oscillators is measured at room temperature to begin measurement of the upper temperature levels.
6. Frequency were made at 10 intervals starting at -30°C up to +50°C allowing at least two hours at each temperature for stabilization. In all measurements the frequency is measured within three minutes after applying power to the transmitter.
7. The artificial load is mounted external to the temperature chamber.

**NOTE : The EUT is tested down to the battery endpoint.**

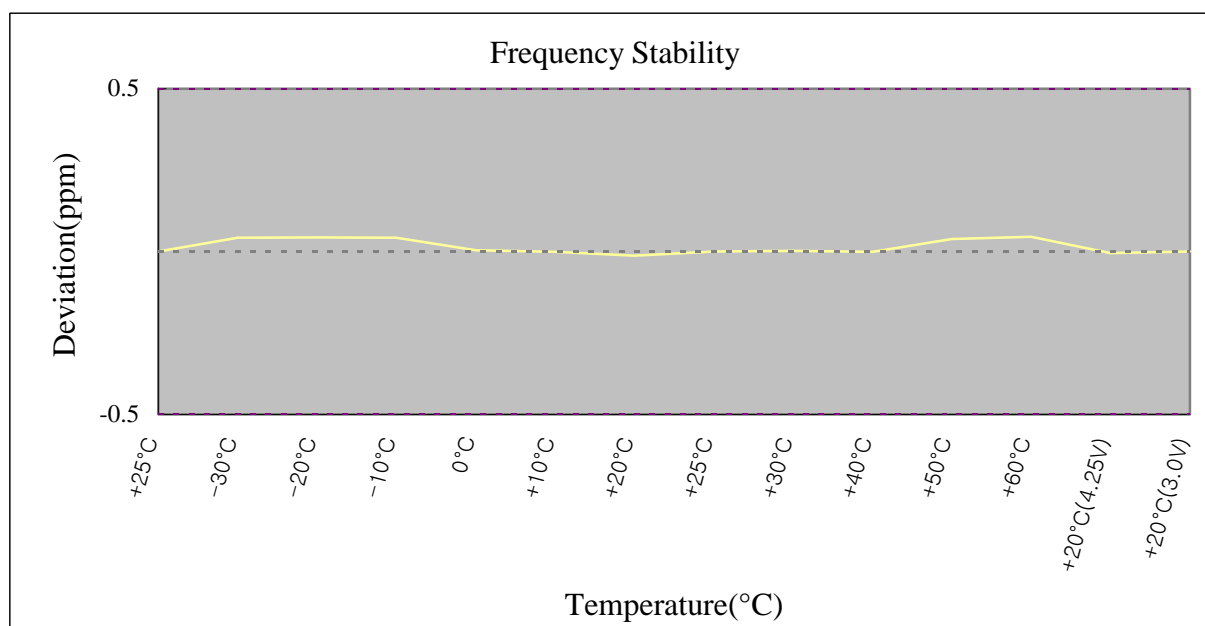
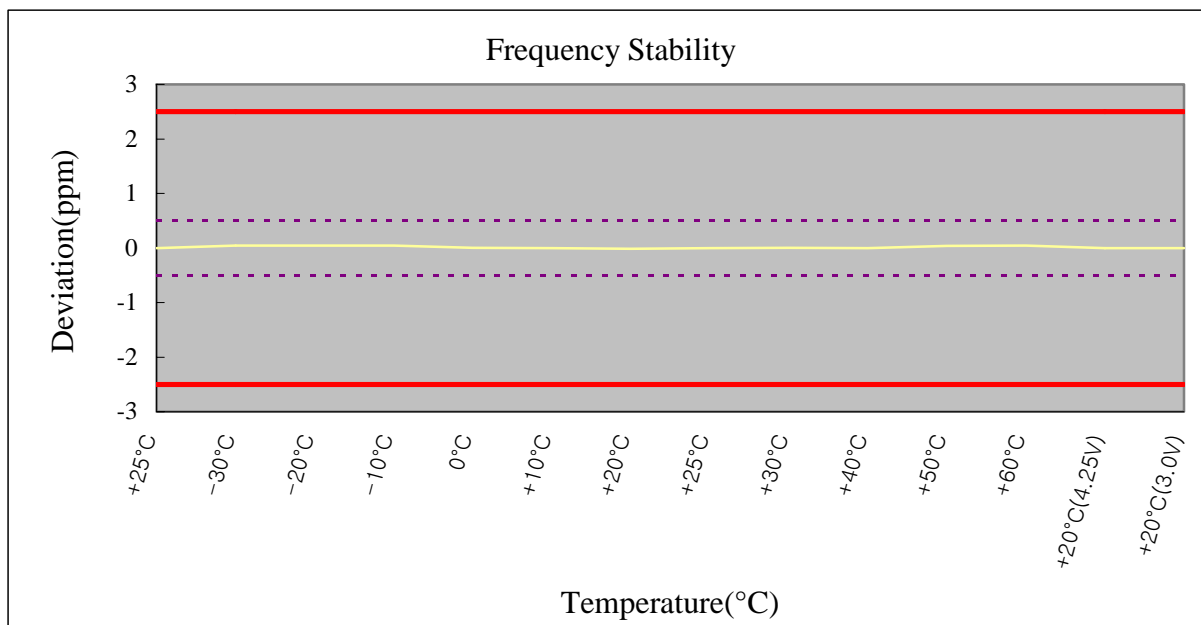
# Frequency Stability (GSM850)

OPERATING FREQUENCY : 836,599,983 Hz  
 CHANNEL : 190(Mid)  
 REFERENCE VOLTAGE : 3.7 VDC  
 DEVIATION LIMIT :  $\pm 0.00025$  % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (dB)	FREQ (Hz)	Deviation (%)
100%	3.7	+25(Ref)	836,599,983	0.000000
100%		-30	836,600,018	0.000004
100%		-20	836,600,019	0.000004
100%		-10	836,600,018	0.000004
100%		0	836,599,986	0.000000
100%		+10	836,599,982	0.000000
100%		+20	836,599,972	-0.000001
100%		+25	836,599,983	0.000000
100%		+30	836,599,985	0.000000
100%		+40	836,599,982	0.000000
100%		+50	836,600,015	0.000004
100%		+60	836,600,021	0.000005
85%	3.15	+20	-	-
115%	4.15	+20	836,599,979	0.000000
BATT.ENDPOINT	3.50	+20	836,599,983	0.000000

Frequency Stability (GSM850)

(continued...)



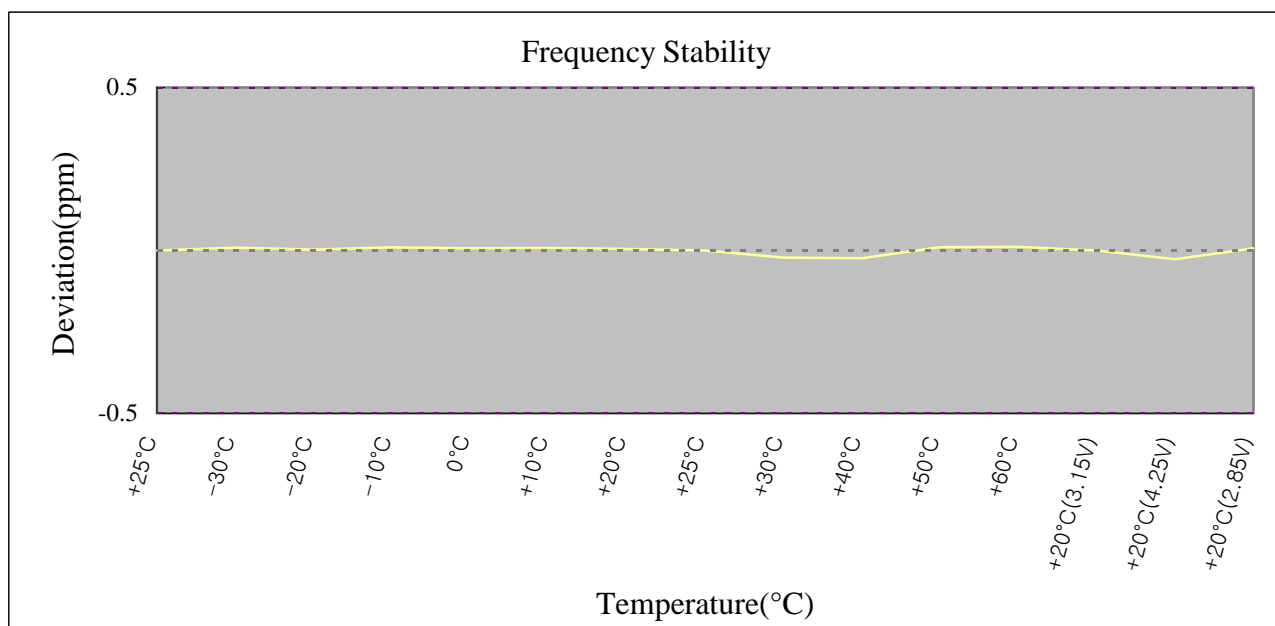
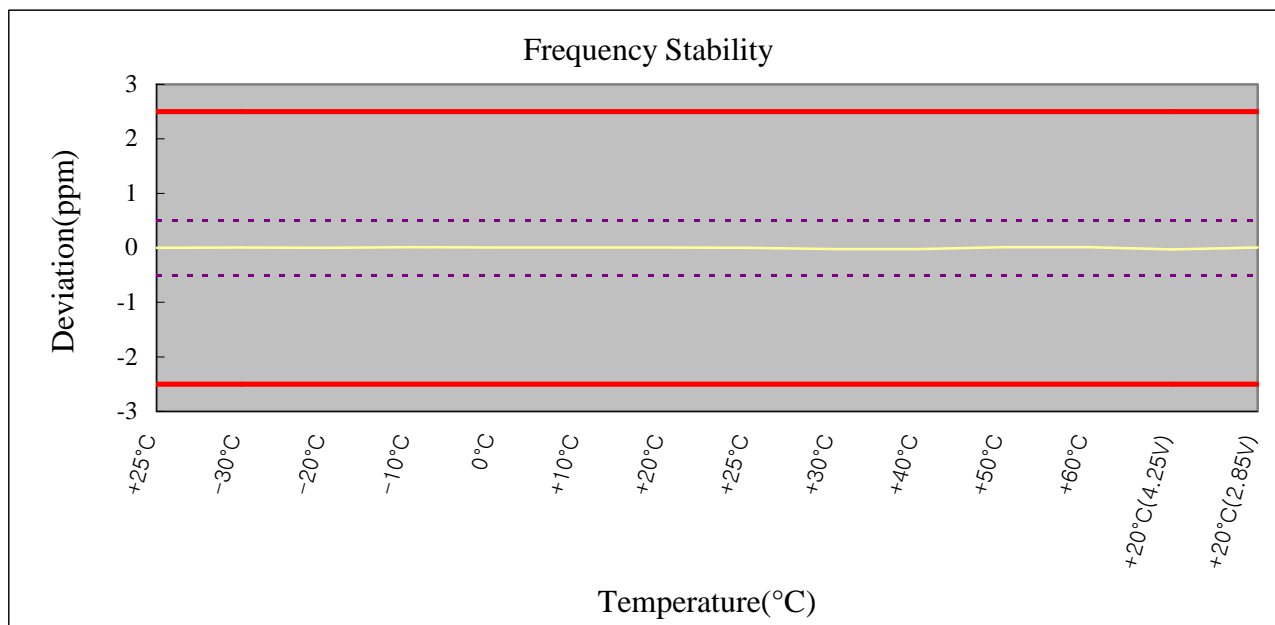
# Frequency Stability (PCS1900)

OPERATING FREQUENCY : 1,880,000,018 Hz  
CHANNEL : 0661(Mid)  
REFERENCE VOLTAGE : 3.7 VDC  
DEVIATION LIMIT :  $\pm 0.00025$  % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (dB)	FREQ (Hz)	Deviation (%)
100%	3.7	+25(Ref)	1,880,000,018	0.000000
100%		-30	1,880,000,033	0.000001
100%		-20	1,880,000,022	0.000000
100%		-10	1,880,000,035	0.000001
100%		0	1,880,000,030	0.000001
100%		+10	1,880,000,032	0.000001
100%		+20	1,880,000,026	0.000000
100%		+25	1,880,000,018	0.000000
100%		+30	1,879,999,976	-0.000002
100%		+40	1,879,999,972	-0.000002
100%		+50	1,880,000,038	0.000001
100%		+60	1,880,000,040	0.000001
85%	3.15	+20	-	-
115%	4.15	+20	1,879,999,968	-0.000003
BATT.ENDPOINT	2.85	+20	1,880,000,030	0.000001

Frequency Stability (PCS1900)

(continued...)



#### 4. TEST EQUIPMENT

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	S/N
01	Spectrum Analyzer	Agilent	E4404B	21/03/07	US41061134
02	Spectrum Analyzer	Agilent	E4440A	05/10/07	MY45304199
03	Spectrum Analyzer	H.P	8563E	06/10/07	3551A04634
04	Power Meter	H.P	EPM-442A	04/07/06	GB37170413
05	Power Sensor	H.P	8481A	05/07/06	3318A96332
06	Frequency Counter	H.P	5342A	21/10/06	2119A04450
07	Multifunction Synthesizer	H.P	8904A	21/10/06	3633A08404
08	Signal Generator	Rohde Schwarz	SMR20	22/03/07	101251
09	Signal Generator	H.P	E4421A	05/07/06	US37230529
10	Audio Analyzer	H.P	8903B	07/07/06	3011A0944B
11	Modulation Analyzer	H.P	8901B	05/07/06	3028A03029
12	Oscilloscope	Tektronix	TDS3052	01/10/06	B016821
13	CDMA Mobile Station Test Set	H.P	8924C	21/10/06	US35360688
14	Universal Radio communication tester	Rohde Schwarz	CMU200	28/04/06	107631
15	MULTISYSTEM UE TESTER	Japan Radio Co.,Ltd	NJZ-2000	14/11/06	ET00095
16	Power Splitter	WEINSCHEL	1593	21/10/06	332
17	BAND Reject Filter	Microwave Circuits	N0308372	21/10/06	3125-01DC0312
18	BAND Reject Filter	Wainwright	WRCG1750	21/10/06	SN2
19	AC Power supply	DAEKWANG	5KVA	20/03/07	N/A
20	DC Power Supply	H.P	6622A	21/03/07	465487
21	Attenuator (30dB)	H.P	8498A	21/10/06	50101
22	Attenuator (10dB)	WEINSCHEL	23-10-34	21/10/06	BP4387
23	HORN ANT	EMCO	3115	06/03/07	6419
24	HORN ANT	EMCO	3115	25/04/07	21097
25	HORN ANT	A.H.Systems	SAS-574	09/11/06	154
26	HORN ANT	A.H.Systems	SAS-574	09/11/06	155
27	Dipole Antenna	Schwarzbeck	VHA9103	18/10/06	2116
28	Dipole Antenna	Schwarzbeck	VHA9103	18/10/06	2117
29	Dipole Antenna	Schwarzbeck	UHA9105	18/10/06	2261
30	Dipole Antenna	Schwarzbeck	UHA9105	18/10/06	2262



#### 4. TEST EQUIPMENT (CONTINUED)

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	S/N
31	RFI/FIELD Intensity Meter	Kyorits	KNM-504D	07/07/06	SN-161-4
32	Frequency Converter	Kyorits	KCV-604C	07/07/06	4-230-3
33	TEMP & HUMIDITY Chamber	JISCO	J-RHC2	13/09/06	021031
34	Log Periodic Antenna	Schwarzbeck	UHALP9108A1	29/09/06	1098
35	Biconical Antenna	Schwarzbeck	VHA9103	18/04/06	2233
36	Digital Multimeter	H.P	34401A	20/03/07	3146A13475
37	Attenuator (10dB)	WEINSCHEL	23-10-34	21/10/06	BP4386
38	High-Pass Filter	ANRITSU	MP526	12/05/06	M27756
39	Attenuator (3dB)	Agilent	8491B	21/10/06	58177
40	Amplifier (25dB)	Agilent	8447D	18/04/06	2944A10144
41	Amplifier (30dB)	Agilent	8449B	21/10/06	3008A01590
42	Position Controller	TOKIN	5901T	N/A	14173
43	Driver	TOKIN	5902T2	N/A	14174
44	Spectrum Analyzer	H.P	8591E	18/04/06	3649A05889
45	RFI/FIELD Intensity Meter	Kyorits	KNW-2402	04/07/06	4N-170-3
46	LISN	Kyorits	KNW-407	11/08/06	8-317-8
47	LISN	Kyorits	KNW-242	11/08/06	8-654-15
48	CVCF	NF Electronic	4400	N/A	344536 4420064
49	Software	ToYo EMI	EP5/RE	N/A	Ver 2.0.800
50	Software	ToYo EMI	EP5/CE	N/A	Ver 2.0.801
51	Software	AUDIX	e3	N/A	Ver 3.0
52	Software	Agilent	Benchlink	N/A	A.01.09 021211

## 5. SAMPLE CALCULATIONS

### A. Emission Designator

#### **GSM850**

Emission Designator = 238KGXW

GSM BW = 238 KHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

(Measured at the 99.75% power bandwidth)

#### **PCS1900**

Emission Designator = 242KGXW

GSM BW = 242 KHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

(Measured at the 99.75% power bandwidth)

## 6. CONCLUSION

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The data collected shows that the **VK Corporation**. Dual band GSM phone **FCC ID: SBWVK4500** complies with all the requirements of Parts 2 , 22 and 24 of the FCC rules.